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THE PRESENT STATUS OF THE KNOWLEDGE OF OTOGENOUS PYEMIA.*

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Differences of opinion on some of the problems of otogenous pyemia still exist, notwithstanding the great increase in the number of cases and detailed reports in the last few years. The unsettled problems are of great practical importance and are proper subjects for discussion. It appears, however, that opposing views are diminishing; it would be a source of gratification if the present discussion should help to bring about a greater unanimity of opinion.

Let us quickly pass over the facts, which through the splendid labors and investigations of Koerner, Zaufal, Leutert and v. Bergmann have received general acceptance. It is unnecessary to enter into the difficulties, which may obscure a diagnosis, when the fever is entirely absent, or is high and continuous, or when cerebral symptoms

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are only apparent; nor is it unnecessary to call attention to the frequently benign character of otitic pyemia nor to the rare cases of rapid and fatal blood infection nor to the fact that the generally fatal prognosis of former times has become relatively favorable by the energetic opening of all infected foci.

The question of causation, and the basis upon which otogenous pyemia arises, deserves great deliberation, because the answer to these problems furnish valuable indications for treatment of this disease. Upon the post mortem table we become most familiar with the obturating and more or less septic and disintegrated thrombus. Reports are accumulating of small thrombi lining the vessel walls, causing pyemia; we also meet with thrombosis of recent origin producing little or no infection; with softened thrombi of this variety from which it is frequently impossible to raise cultures. Extradural abscesses of immense size contiguous to the sinus force, at times, the conviction that pressure of these enormous accumulations of pus and granulations have compressed and obstructed the sinus and produced a thrombosis by purely mechanical means without infection and without the possibility of a subsequent pyemia.

We must attempt to find a solution to the question, if a periphlebitic process can pave the way for resorption into the body of poisonous and pyogenic substances, be they cocci or toxins, when the endothelium is intact or affected with such insignificant lesions as to permit a prompt restitution after the removal of the purulent focus next to the sinus, and whether or not extradural abscesses contiguous to the sinus may not alone produce pyemic fever without metastases, which promptly and completely subside after their evacuation. Wide differences of opinion finally exist as to the extent, manner and characteristic symptoms, produced by pyogenic substances taken up by the body, from the bone of the mastoid process or from cavity of the middle ear.

The importance of abscess formation along the sinus and of inflammatory processes along the walls of the vein is admitted. Practically we have to deal only with the sinus transversus, mostly within the sulcus sigmoideus and jugular bulb; rarely with the superior petrosal sinus.

The exterior wall of the sinus is thin and consists only of the exterior layer of the dura. A septic and infectious process along the sinus exerts an adverse influence with far greater facility upon the endothelium and the contents of the sinus than a similar process could produce upon the cerebral portions of the dura through its entire thickness. These differing conditions are very apparent. The immediate influence of an extradural abscess is confined to the exterior layer of the dura and no fever exists. In gangrenous conditions we often find to our astonishment on post-mortem examination the inner layer of the dura intact and protecting the brain, although we expected to find a disintegration and necrosis of the entire dura. In periphlebitis, however, we find the infiltration of the external layer bringing the infectious focus at once into direct proximity with the endothelium, frequently causing gangrenous inflammation of the external sinus wall.

In periphlebitis, especially where large enclosed abscesses exist, lymphatic connection with the interior surface of the veins is formed. In phlebitis, where the entire wall of the vein is inflamed, the contact with the septic substances is even more direct and immediate and productive of lesions of the endothelium and frequently of a thrombus lining the wall. We have here by direct resorption an immediate ingress of toxins or cocci into the blood. The frequent appearance of fever, when a perisinuous abscess exists, seems therefore in entire harmony with the nature of the affection.

The fever is of pyemic character as a rule, not accompanied by metastases. A minimal periphlebitis, appearing as a slight thickening of the wall or as a barely noticeable discoloration or as a velvety layer of the minutest granulations, may according to its degree of virulency produce grave pyemic conditions, while an immense extradural abscess may be almost or entirely unaccompanied by high temperatures. The fever usually subsides immediately after laying bare and thoroughly cleansing the perisinuous focus.

The endothelium is lost when subjected to prolonged inflammation or to high virulence of septic material; small deposits are formed and a wall-lining thrombus is produced; grave pyemia and embolic metastases now readily occur. The wall-lining thrombus developes into an ob-

turating thrombus and establishes an occlusion of this vein and for a time its elimination from the circulatory system, and in this way there is frequently a temporary subsidence of the pyemic symptoms. The wall-lining thrombus may subside, if the supply of infectious material ceases either by spontaneous cure of the proximate infectious focus or by thorough exposure of the diseased sinus.

A solid thrombus, if only moderately infectious, can and as a rule does subside after early exposure of the perisinuous focus. The pyemic fever ceases at times quickly, at times somewhat slowly, the spread of metastases ends and those already deposited are overcome more or less quickly and successfully by the natural recuperative forces of the body.

The thrombosis caused mechanically, by compression of the sinus, followed by coagulation of its contents, will always remain free of infection, if the nearby infectious focus be early removed. It is a mistake to operate on this kind of a thrombus, as even the use of the exploratory needle may convey the infection.

All of these considerations are applicable when the disease affects the jugular bulb. The primary infection of the jugular bulb is quite rare, considering its direct proximity to the middle ear. This peculiarity rests upon the fact that chronic middle ear suppurations lead mainly to pyemia mostly by extension into the mastoid process, where the infectious focus is brought into direct and continuous contact with the sinus. The large class of cholesteatomata especially diverts the infection from the jugular. Acute inflammation of the middle ear, however, often primarily endangers the jugular bulb as we shall see hereafter. In pyemia consequent upon acute middle ear suppuration, phlebitis of the jugular bulb is for this reason of especial importance and needs to be thought of, when the exposed sinus shows no involvement. Infection of the jugular bulb prevails in proportion as the appearance of pyemic symptoms is early in acute middle ear suppuration.

Besides the phlebo-thrombosis—the diseased condition of the sinus wall or sinus—the suppurative process localized within the mastoid has been held accountable for the causation of pyemia in many instances and has been ex-

plained by the assumption of an inflammation of the small mastoid veins. The effect of an osteophlebitis in the mastoid process can, however, differ in no way from the suppuration in the bone itself unless the vein be the subject of phlebo-thrombosis at its point of entrance into the sinus. When such is the case, it presents the condition of a wall-lining thrombus of the sinus. Koerner especially has recently described this method of causation of pyemia by osteophlebitis as a distinct disease, though this condition had for a long time been generally assumed in mild cases. He contrasted it with sinus-phlebitis, mentioned its occurrence as not rare, furnished much literary proof on the subject and held it as easily diagnosed.

In order to judge as objectively as possible upon the basis of real facts the question of spontaneous cure of sinus-thrombosis, I formerly looked upon most of the cured cases of pyemia as arising from the mastoid process alone. The larger the number of cases has grown which have come under my personal observation, the more have I receded from this opinion, a position which has been verified by observation upon the operating table, by the systematic exposure of the sinus in all febrile complications and by use of the exploratory puncture, which has taught us to recognize thickening of the sinus wall by deposit on its inner surface. This opinion has also been strengthened by the discussion by Leutert a few years ago. In my cases of pyemia of this kind, disease of the sinus has always been recognized.

The conditions for resorption seem to be quite unfavorable in the mastoid process, especially so in the sclerosed variety, so frequently found in the aged. This explains the almost regular freedom from fever in uncomplicated suppuration of the mastoid even if the pus be confined under high pressure. Fever in the beginning of acute purulent middle ear inflammation, when it is most liable to exist, is not usually due to suppuration, but to a hyperemia or a serous affection. Temperature from this cause subsides, if free drainage is secured, as a rule, after the first acute stage permanently, except in very small children; mastoid affections, of relatively mild degree, are accompanied at times by a high fever in severe cases of measles or scarlet fever. Grave pyemia with chills and metasta-

tic abscesses however are never caused by a suppuration within the mastoid.

Post mortem observations of Ponfick and Brieger upon the body and the blood prove beyond doubt that in infants and very young children toxins, staphylococci, etc., can be absorbed directly into the blood from the diseased bone of the mastoid or from the suppurating middle ear. This method of absorption disappears gradually with increasing growth and this origin of pyemia has no practical importance in adults. I do not deny the possibility of pyemia of a mild character arising directly from suppurations in the mastoid process, but I seriously doubt its frequency, its significance in practice, and above all the occurrence of metastases in these cases.

It is of interest to inquire how far this method of causation of evident pyemia with metastases is proven in our literature.

If we want to prove the existence or the possibility of existence of a pyemia without any participation of the sinus or jugular bulb by citation of cases, it is necessary to exclude perisinuous abscess or periphlebitic affection; furthermore no noticeable indications of jugular phlebitis should support the suspicion of jugular implication.

The most convincing proof is furnished by such cases in which post mortem examination has thrown clear light upon the question. The examination can only be considered as sufficient when the record of the autopsy not only clearly states the condition of the sinus, but assures us of the examination of the jugular bulb by its specific mention. Even this requisite does not satisfy every claim. A recent publication from Schwartze's clinic proves that wall-lining thrombi in the jugular bulb may escape the observation even of an expert in post mortem examinations and may only be found by minute examination of the removed temporal bone. With these precautions I shall examine the large number of published cases which have been principally collected by Koerner. The entire literature, with exception of the cases reported in the Transactions of the Otological Society were at my disposal.

We must exclude from this consideration without doubt cases in which the autopsy or operation showed thrombo-

sis to have existed in three cases, also cases with perisinuous abscess (six or probably eight cases), together about eleven cases, also the cases with clinical symptoms of jugular phlebitis (four cases); finally cases in which, very shortly after jugular ligation, a septic thrombus formed in the sinus (two cases), as they do not seem especially appropriate to furnish proof against a primary wall-lining thrombus. Of sixty cases reported, 15-17 cases may therefore be excluded as of no value. There can be no question that these 15-17 cases furnish no evidence as to whether or not so-called osteophlebitis can produce pyemia without implication of the sinus. Fifteen of twenty-six operated cases have been insufficiently described or operated upon, and consequently they are not suited to convey information on the question of existing perisinuous abscess or of periphlebitis.

Sixteen cases recovered without operation. In these cases speculation may have free play. It is hardly doubtful, however, that in a debatable question, these cases which themselves need elucidation, can be of no great value as proof. Of the twenty-six operated cases some were without pus in the mastoid; six times the mastoid was found healthy and even sclerotic. The origin of osteophlebitis in these cases is surely an open question.

But the origin of sinus phlebitis may well be questioned in these cases. I have seen very insignificant alterations in the mastoid process without any secretion, productive of evident periphlebitis and leading to grave sinus disease. In some of the reported cases pyemia occurred some time after the operation, in others pyemia was already existing without evident disease of the mastoid. These are manifestations which can not be regarded as self-evident of ostoephlebitis, but they may readily be explained by the assumption of phlebitis of the sinus or jugular bulb. I may not pass without mention of the fact—even if it proves nothing—that I have at times regarded my own cases of this kind as thrombosis of the lateral sinus. In half of the number of cases the autopsy has either been insufficiently made or insufficiently reported. In no case has the examination and condition of the jugular bulb been explicitly stated. The findings have been restricted entirely to the condition of

the sinus. Deducting these cases, only a small number remains of the respectable number of sixty reported cases and the remainder does not bear a very critical investigation. It also deserves to be mentioned that 25 per cent. of the cases were caused by a chronic middle ear suppuration, 15 of which (over 25 per cent.) died, 13 times metastatic abscesses occurred in the lungs, several times in the kidneys and spleen and 37 times (3 times as often) in the muscles and joints. Koerner also seems to exclude the cases in which pulmonary metastases occurred. Of 41 acute cases, 32 recovered; of the 16 chronic cases, 10 recovered. As I have already mentioned, I do not absolutely deny the possibility of an osteophlebitic pyemia. It is, however, of great practical value to determine if this kind of a pyemia does occur as frequently as contended by Koerner and other authors. I believe that I have shown that proof, therefore, can not be furnished by the existing literature on the subject. Following the example of Leutert, recent observers have certainly become more skeptical. I recall to you a publication of Eulenstein, who made a diagnosis, of phlebitis, with wall-lining thrombus, in a case which he would formerly have regarded as of the osteophlebitic type. This shows the diminishing danger of arriving at a diagnosis of osteophlebitis in cases of a phlebo-thrombosis, or of being satisfied with opening of the mastoid alone, as Hoffman did years ago in a case of phlebitis, where the necessity for exposing the large vessels exists.

In what relation does the uniform material of my own observation stand to this question? Nine years have passed since my first publication on sinus thrombosis. How has the pyemic process shown itself in my observation during this time? In a number of cases of mastoid disease, fever was present. The operation usually uncovered a perisinuous abscess, and the fever as a rule subsided readily after the operation. Several times it was only subsequently possible to find a thrombus in the previously free sinus. Of 63 cases of pyemia seen and operated upon by myself it was impossible in 3 or 4 instances to find a thrombus of the sinus or jugular; instead more or less intense periphlebitic processes were present. In 2 cases only these were sufficiently insignificant to permit doubt of the probable entry of the infection at this point. In one of

the cases the jugular vein also showed no evident inflammatory changes, when it was ligated; the other case recovered without ligation. The gravity of the pyemic symtoms in this case compelled the assumption of a phlebitis or thrombus of the bulb, rather than a healthy state thereof. Only one case remains in which the ligation of the jugular brought about a cure of lasting pyemic symptons without coexisting evident alterations of the sinus or jugular. This was a case of severe infectious scarlatinae otitis, which had produced a necrosis of the bony wall of the sigmoid sinus. The existence of a light periphlebitic process with necrosis of the bone suffices in a case of severe infection to hold the sigmoid sinus responsible, as the focus of eruption of a pyemia without metastases. This case is the only one which could be regarded as osteophlebitic.

When is the diagnosis of osteophlebitis justified? Koerner, whose excellent treatise has often been a pleasurable source of information to all of us, has in the 2d edition, with increased attention interested himself in this affection. He regards the assumption of pyemia as justified when high fever with chilly sensations occur in a case of acute middle ear suppuration without impediment to free drainage. If, in addition to these symptons, metastases occur in the joints, serous cavities or muscles, osteophlebitic pyemia may be diagnosed with great probability. In chronic purulent cases pulmonary metastases point to sinus phlebitis, even without definite symptoms of occlusion of the sinus or jugular. In 20-25 per cent. of the cases collected by Koerner, pulmonary metastases were present, and as many cases had chronic suppurations. We may add that fever with chills is indicative of pyemia in chronic cases as well as in acute, and that fever without metastases should, in chronic cases, permit the assumption of osteophlebitis as the cause of the pyemia with better reason than when metastases are present in the muscles, etc.

To hold the mild or severe course of a disease as indicative of the location of the infectious focus, especially in a disease so variable as septicopyemia, is not permissable. The virulence of the infection is frequently of more influence on the character of the disease than the size of

the diseased blood vessel. The existence of sinus thrombosis could not be diagnosed in two of my cases of the last 9 months on account of the absolute lack of febrile manifestation (chronic cases with cerebral symptoms), and in two other cases on account of the minimal temperature (38.2 per cent.). 7 cases of acute middle ear suppuration resulting in recovery showed mild metastases in the muscles and joints; of the chronic cases only one showed this complication. Pyemic fever, without metastases, was observed once only in acute suppurations. These ten cases of my own presented the picture of osteophlebitis as described by Koerner, and three other cases showed even fewer symptoms. In all of these cases a thrombosis of the sinus or jugular vein was demonstrated with certainty by the operation. I could cite even more cases of a prior time. I have observed another case of pyemia without metastases, due to periphlebitis, in which the patent sinus became thrombosed 2 days later.

As opposed to these cases I have observed 3 very grave pyemic cases without demonstrable thrombosis. The first had a severe septicopyemia with numerous metastases in the joints, muscles, eyeball and a severe nephritis. After a long confinement he recovered. We found an inconsiderable periphlebitis with a few drops of pus on the prominent portion of the sinus, which was easily torn and bled severely during the operation; an insignificant amount of inflammation existed in the mastoid process; the jugular vein which, in my opinion was probably diseased, was not investigated. The second case was the patient with scarlet fever otitis, already mentioned. The third case was one of intense pyemia, with a large perisinuous abscess, with a gangrenous and discolored sinus wall of great friability: The tearing of the sinus wall caused a copious bleeding. The jugular was tied four days later and showed no discernible pathologic lesion. An abscess of the lung was evidenced by expectoration on the evening after tying of the jugular. In this case a thrombosis could not be demonstrated, but without doubt sinus disease existed. It is self-evident that a wall-lining thrombus often furnishes more favorable conditions for a severe general infection than an obturating thrombus.

From the considerations presented, we must deduce the

conclusion that Koerner has invested the process known as osteophlebitic pyemia with an importance not properly belonging to it. He says: "The pyemia without affection of the sinus seems much rarer than the otitic pyemia with phlebitis of the sinus." I hold that if pyemia without infection of the sinus occurs at all, it is extremely rare and of no practical import. Metastases in the muscles, joints, etc., do not exclude the probability of a diseased sinus, on the contrary, their existence points to a disease of the sinus or bulbus jugularis. We have not been able to confirm the opinion, either by investigating the literature on the subject, or by our own observations, that the course, the kind of metastases, the complications, or prognosis of osteophlebitic pyemia is materially or easily distinguishable from the symptoms produced by pyemia due to sinus phlebitis. A phlebitic process of the sinus can, with due attention, be readily recognized as far as the end of the sigmoidal portion of the sinus. From there to the foramen lacerum it is more difficult, and a periphlebitis of the bulb is outside of the possibility of direct observation. I do not assume that for this reason a periphlebitis of the bulb may be regarded as an improbable affection, or that its existence, as a phase of pyemia, can be denied. The danger to the jugular bulb in the beginning of an acute middle ear suppuration, due to a virulent and severe infection is enormously greater than to the more distant lateral sinus. This corresponds to the anatomic conditions, which are especially favorable in acute purulent middle ear inflammations, to cause a spread of the disease to the jugular bulb. A contamination of the adjacent bulb is favored by high virulency of the infection, by delay in spontaneous rupture of the drum and by favorable anatomic conditions, such as a high-reaching jugular fossa, an extensive surface of opposition of the jugular fossa and bulb, and by dehiscences.

In a case of severe sepsis, due to acute grippal middle ear inflammation, a purulently decomposed thrombus of the upper portion of the jugular was found on the 7th day after the appearance of fever.

This shows how quickly septic decomposition of thrombus of the bulb also may occur. It is quite possible that an extensive distribution of septic material through the body

may be derived from a wall-lining thrombus before the jugular bulb has become obliterated, and that the patient may succumb, even if the jugular vein be ligated. I regard all phlebitic processes in the jugular bulb as of greater importance in the production of general systemic infection than the analogous processes in the transverse sinus. It seems, however, that the conditions for spontaneous cure of periphlebitis are relatively favorable near the bulb, provided that the infection be not of extreme virulency.

For the production of pyemia the lateral sinus needs the influence of a long persisting retention and of an increasing severity of the disease external to the sinus. Near the bulb we have a reversal of these conditions. Either a spontaneous rupture of the drum occurs or the pressure on the middle ear is relieved by paracentesis. The height of the inflammatory process soon passes after this procedure. The infectious supply and pressure on the bulb cease. The periphlebitis, the disease of the vessel wall, can now recede, and the wall-lining thrombus does not enlarge or renew, inasmuch as the infection has been withdrawn. If a virulent infection has not yet produced a severe local or general infection, restitution may even take place. When the sinus shows no diseased alterations in cases of mild or severe pyemia, we must consider the probability of a bulbar phlebitis, especially in cases of acute otitis.

In my material, acute otitis is in excess (16:11). The relative preponderance of primary bulbar phlebitis is not surprising and is, without doubt, the cause of several cases of pyemia, inclusive of 2 fatal cases (Schiller, Bohne).

Consensus of opinion exists in the treatment of otitic pyemia, as to the necessity of eliminating the septic decomposed thrombus from the circulatory system. To what extent the ligation of the jugular vein is necessary, desirable or superfluous, is still under discussion. In the treatment of the wall-lining thrombus no unity of opinion prevails.

All agree to the necessity for operative interference in every case of pyemia, regardless of the spontaneous recoveries from pyemia which are recorded. Our end in view must not be the exposure of the pus accumulation

in the mastoid, but at the very least the inspection of the sinus. A number of cases of mild pyemia are cured by the removal of the pus focus adjacent to the sinus.

This procedure is insufficient, if a progressive septic thrombus exist within the sinus. A septic decomposed thrombus must be rendered innocuous by opening and eliminating the diseased bloodvessel. To do this we must consider either the incision of the sinus or the ligation and emptying of the jugular or both operations together.

Less precise are the indications when we meet an inflammation of the vessel wall, or a wall-lining thrombus, or when we are in doubt about the exact nature of the existing disease. Compilations show that the ligation of the jugular in pyemia is followed by better results than the operation on the sinus without ligation of the jugular. Of 94 cases, in which no primary indication of jugular disease existed, 40 were operated, according to Viereck's compilation, with ligation of the jugular and 54 without. Of the 40 ligations, 6 (15 per cent.) died and of the 34 cured cases 6 had metastases. Of the 54 cases operated upon without ligation, 13 (24 per cent.) died and of the 41 cured cases, 16 continued to have pyemic fever and 2 had metastases. Viereck advocates the ligation of the jugular in all cases and like Zaufal, Voss, Dalgren, Knapp, Broca demands the ligation before operating on the sinus. Koerner holds the ligation in all cases as justified and v. Bergmann mentions in his textbook ligation as a recommendable part of the operation, after speaking at the congress of surgeons in 1895, absolutely in favor of ligation before operating on the sinus. Hessler does not advocate ligation in all cases. Brieger considers the prophylactic ligation of the jugular as superfluous and even dangerous. Leutert advocates ligation mostly after opening of the sinus and with certain restrictions. MacEwen, who some years ago reported 20 recoveries out of 28 cases operated upon and who attained the greatest number of recoveries, seems to have operated on the sinus alone, even in cases with clinical symptoms of jugular involvement. It can not be stated from his writings that he is opposed to ligation of the jugular. It is to be regretted that MacEwen has not published his entire material. His book contains only 4 cases of inconsiderable interest. Some authors demand

the ligation of the jugular in every case, others do not insist on it as a matter of necessity in every case, but are generally in its favor, still others hold in certain conditions the jugular ligation as superfluous, some even as dangerous. There seem to be no absolute opponents to jugular ligation in all cases. It is unnecessary to insist before this body that the ligation of the jugular as the first step of the operation is necessary in all cases in which jugular implication is established. These cases are not frequent. The indication for ligation of the jugular as first step of the operation may even be extended to include all cases of sepsis or extremely severe pyemia with frequent chills, bad general condition and all cases having metastatic abscesses. In all other cases the opening of the mastoid antrum or the radical operation is followed by baring the sinus, Should the incised sinus give exit to a liberal quantity of decomposed fluid, it may be assumed that the septic process has either progressed to the jugular bulb or continually threatens to infect the bulb. The jugular vein should under these conditions be at once ligated. Should the decomposed septic material extend to the periphery and a solid red thrombus fill up the space toward the jugular, we should limit the operation to the sinus alone. In these cases the ligation of the jugular is mostly superfluous. A septic fetid pus focus is of greater danger than an accumulation of creamy pus. In the former the ligation of the jugular may need earlier consideration than in the latter condition. Former statements of mine in regard to jugular ligation have been repeatedly misunderstood. In calling attention to the fact that under certain conditions the ligation of the jugular endangers the inferior petrosal sinus, I desired by no means to put myself absolutely in opposition to ligation of the jugular. If we find in the sinus a still solid thrombus, or a small septic focus, or a pus focus consisting of inoffensive creamy pus, which does not reach near the bulb, the opening of the sinus to the point, where it is occluded by a healthy, not discolored thrombus, and the excision of the wall usually suffice. Success seems to be the more assured the further back the decomposed thrombus is located. It is necessary to expose the sinus toward the periphery for several centimeters to its healthy portion and proceed until

fresh, red thrombus is reached. It is good practice to remove this thrombus with a sharp spoon to the extent of free venous bleeding. It is, however, unnecessary to proceed this far in every case. Frequent changes of dressing, daily or on alternate days are of advantage. To find a septic thrombus reaching beyond the torcular Herophyli is rare, when a timely operation has been performed.

What should be our method of procedure in cases where we find the sinus filled with fluid blood? The question presents itself whether we have before us a perfectly healthy sinus or a wall-lining thrombus. When we have exposed a periphlebitic focus we are justified in stopping the operation and awaiting the result, if no grave pyemic symptoms be present. Some authors demand even in these cases the prompt opening of the sinus, but it seems to me without sufficient reason. When a wall-lining thrombus can be demonstrated, the general condition of the patient and the character of the pyemia must decide our further procedures. The jugular should be ligated, when pyemic symptoms are marked. We must assume a primary affection of the jugular bulb, when we have before us a perfectly healthy sinus, without periphlebitis and without disease of the vessel wall. If the pyemic symptoms are slight we may await the result of the operation. Well defined symptoms of pyemia, repeated chills or bad general condition necessitate in all cases the immediate ligation of the jugular, a procedure, which even in the less pronounced class of cases, can not be regarded as faulty. In these cases the jugular should be tied high, above the facial vein, while usually the ligation is best made further down in the region of the thyroid cartlage in order to operate with certainty below the thrombus. The ligation of the jugular is followed by the tying of the facial vein and the excision or the incision of the upper portion of the jugular with a probe pointed bistoury. The wound of the neck must remain open. The sinus must also be watched and incised as soon as a septic thrombus becomes manifest. As a rule the operation first exposes the sinus. In all doubtful cases this procedure is an eminent necessity. The examination of the sinus begins with palpation, followed by exploratory puncture for the determination of the nature of its contents. If a solid thrombus be found,

it usually suffices to expose the sinus, if no grave pyemic symptoms are present. Even if the jugular vein be free of disease at the time of operation, we need not blame ourselves, should we decide to ligate it for making a useless operation, as a wall-lining phlebo-thrombsis can not be recognized and, when present, may be a serious distributing focus of pyemic infectious material. The incision of the sinus for therapeutic purposes and even more so for diagnostic purposes, when a free stream of blood still flows through it, I hold with v. Bergmann as ill-advised, in opposition to the opinion of Leutert and others. The reasons therefor are evident. The free bleeding after the incision limits our freedom of action. The dressing has to remain in place for a longer time than we would leave it otherwise. The probability of hemorrhage, when the dressings are changed, prevents a careful examination. During the time the dressing must remain in place, the thrombosis may, without interference, spread backward, even if we have prevented its centripetal spread and damage by ligation of the jugular. It can hardly be considered correct to say that by incision the diseased section of the vein can be eliminated from the circulation. It is not always possible during the free bleeding to incise the sinus as far as desirable or through the entire extent of the diseased area. It is furthermore incorrect to assume that the elimination of the circulation of the sinus can only be accomplished by tamponing after the incision. In this locality and especially in the sigmoidal portion of the sinus, the unincised vessel can by careful tamponing be readily so compressed as to make it impossible for blood to flow through it.

Before making an exploratory puncture we must be sure about the position and course of the sinus and about the fact that its lumen still exists. The escape of its purulent contents through a small and obscure fistula may have caused a collapse of its walls, or the exterior wall may have been destroyed entirely, which might cause the inner wall to be taken for the outer portion of the vein. It is necessary to avoid entrance into the cerebellum by pushing the needle beyond the sinus and to be mindful of the fact that a negative result of the exploratory puncture may be due to the needle not having passed through the thickened and thrombotic exterior wall of the sinus. Even with a

negative result of the exploratory puncture the thrombus may be partially or entirely of a highly septic character. Different methods have been devised to aid in the decision after the sinus has been incised, as to whether or not the jugular bulb is thrombosed. One of the methods consists in exerting pressure upon the jugular vein after incision of the sinus and watching for the return flow of blood or pus. I am of the opinion that this procedure should be abandoned. It seems to me more rational to ligate the jugular at once, if the incision of the sinus carried as near the jugular bulb as possible, shows the vein to be empty and exposes no thrombus, rather than incur the liability of setting free portions of the thrombus. In cases in which the sinus is filled with blood and a thrombus in the bulb is suspected, the method of digital compression described by Whiting may be used. It consists in compressing the lower end of the sinus and while removing the blood from the portion of the sinus above the point of compression; pressure should be exerted on the sinus with the second finger. Releasing the lower point of compression blood will flow in the absence of the thrombus in the jugular bulb. I can not commend even this procedure.

My own material consists of the following cases:

From the University Ear Clinic, I have published 13 cases operated with incision of the sinus, with 8 recoveries, 3 cases operated with incision of the sinus and jugular ligation, with no recovery. Two of these cases were primarily ligated. I can now add 41 cases to those reported some years ago at Dresden. (In one case, in which the differential diagnosis between meningitis and sinus thrombosis could not at once be made, I ligated the jugular. This case proved to be meningitis.)

Of these 41 cases, 7 were not operated upon with one death from meningitis.

In 18 cases (16 per cent.), the sinus was incised with 4 deaths. In 17 cases the jugular was tied, and in all but 3 the sinus incised as well, with 4 deaths. Of 3 cases without jugular ligation and without incision of the sinus, 2 died. Of the total number, 32 recovered, 8 died, 22 were acute cases, 19 chronic.

The following remarks are based upon cases observed within the last few years. They were 27 cases, of which

16 were acute and 11 chronic; 5 of these cases died, one of which was not operated upon, as the symptoms of meningitis masked the existence of a sinus thrombosis, which was not diagnosed. In 2 fatal cases, the sinus alone was operated upon. One died 4 weeks later of meningitis; the other case died two hours after the operation from heart paralysis, due to a hypodermic of morphin given by her husband, who is a doctor. The autopsy showed many points of cerebral hemorrhage. Ether was used as anesthetic and was well borne; the thrombus was of recent origin, and consisted of blood. The patient had no fever. In the 2 remaining fatal cases the jugular was ligated. Both had primary thrombosis of the jugular. One died of pulmonary metastases; the other died of septic fever on the 12th day after the first appearance of fever. This patient had an acute sanguineous middle ear inflammation of grippal origin. Only a post mortem examination of the brain was permitted.

Of 22 recoveries, 14 had acute and 8 chronic middle ear disease.

In 9 cases the jugular was ligated, either before or after the incision of the sinus.

In one case the sinus was not incised.

In 10 cases the sinus only was incised; in 4 cases a periphlebitic infectious focus was laid bare.

Of special interest was the frequent occurrence among these patients of neuritis optica, which was observed in 10 cases. Sinking of the upper posterior sinus wall was noted in 8-10 cases; the sinus was extremely prominent in 3 cases. Perisinuous abscesses were found 12 times, 4 times entirely encapsulated. The periphlebitis showed itself as a light membranous deposit, or as a minimal thickening of the sinus wall, or as minute superimposed granulations in 6 cases; the sinus wall was found discolored 12 times, and covered with a sequestrum once. Hemorrhage occurred 2-4 times. The thrombus was found solid twice, purulently decomposed twice, partially composed of granulations once. In about 4 cases the condition of wall-lining thrombosis presented itself. The thickening of the sinus wall could be shown to exist by puncture with the aspirating needle. The exploratory puncture showed in 4 cases at first blood only, but after 2 or 3 days no blood or pus.

The mastoid process was full of pus or granulations in 11 cases; sclerotic twice, only hyperemic and free of pus or granulations once and co-existing with a septic decomposed thrombus. The sinus wall showed a large portion missing once; fistulæ were seen 2-4 times. After ligation the jugular vein showed itself empty up to the basis of the skull twice, occupied by a solid thrombus once and by a septic decomposed thrombus 2 or 3 times. Indications of disease of the jugular vein were present 5 times, manifesting itself as pain on pressure, swelling and dysphagia.

The bacteriologic examination was negative once, showing most often the presence of streptococci, and at times staphylococci; once pyocyaneus besides the staphylococcus. Metastases occurred 4 times in muscles and joints; pulmonary abscess once, with recovery. The cerebral complications are of special interest. Abscess in the temporal lobe occurred once; infectious spinal meningitis was observed twice and the diagnoses confirmed by lumbar puncture. One of these cases showed abundant pus present. Both cases recovered.

The course of the fever is of great interest. Of the patients operated upon the sinus alone, 2 had no subsequent fever; one of these had a solid and one a softened thrombus. Another patient with a solid thrombus had minmal temperature for 3 days. Before the operation on the sinus, 6 patients had fever, which ceased with the operative interference. In 2 cases slight fever continued after the operation and considerable fever prevailed in one case of spinal meningitis. After ligation of the jugular, fever ceased at once in 2 cases; continued high for 8-40 and 14-39 days in 5 cases, in some cases due to metastases. In one case fever which had shown a temperature of 39-7, subsided after the second day. Immediate ligation of the jugular vein was performed 3 times. In 3 cases the jugular was tied on the 4th, 5th and 8th day respectively, after the sinus had been incised. The sinus and jugular were operated upon in 4 cases; 4, 8, 9 and 10 days after the mastoid operation. In the fatal cases the jugular had been tied 2, 3, and 4 days after the mastoid operation. In the fatal case, in which the symptoms of arachnitis masked the existence of a sinus thrombosis, the thrombosis had probably existed

for a prolonged period of time. In 2 cases we dealt with unquestionable primary bulbar thrombosis, as the sinus contained fluid blood 2 days before the ligation of the septic infected jugular vein. The cerebral symptoms, high continuous fever and delirium, led to the assumption of meningitis in one case until a fall in temperature occurred on the 2d day, which caused us immediately to ligate the jugular. In the 2d case of sepsis the lumbar puncture showed cloudy fluid not under great pressure. The microscopic examination showed streptococci without pus corpuscles. The fatal prognosis based upon this confirmation of the diagnosis of meningitis prevented the incision of the sinus after it became subject to thrombosis subsequent to the ligation of the jugular. In this case of sepsis a metastatic abscess existed in the ankle joint, and phlegmonous inflammatory areas appeared in different portions of the dermis. In another septic case, pulmonary metastases existed.

Adhering to the principles just stated, not to ligate the jugular vein, a priori, in every case of pyemia, where we find only perisinuous abscess, a wall-lining or solid thrombosis, nor to ligate in cases where we have completely uncovered a limited purulent focus in the sinus, which does not lie adjacent to the bulb, I have, in late years, accomplished the following results. Of 10 cases in which the sinus was operated upon, all recovered without prolonged fever. Of 12 cases, with jugular ligation, 3 died. In one of the fatal cases, the sinus had not been incised; it was not incised in two cases which recovered. Prolonged high temperature prevailed in some of this class of cases. It is proper to state that in all severe cases, the jugular vein was primarily or secondarily ligated. 3 cases recovered without operation on the sinus or jugular vein. (2 fatal cases must be omitted: a case of meningitis, in which the diagnosis had not been made, and the case of cardiac paralysis 2 hours after the operation, due to a morphin injection.) These results are far better than shown in Viereck's compilation of cases of sinus operation alone, but considerably worse in the cases of jugular ligation. I have altogether made 50 operations, with 35 recoveries—70 per cent. of these,

30 were sinus operations, with 22 recoveries—73 per cent.

20 were jugular operations, with 13 recoveries—65 per cent.

Cases in recent years:

25 cases of sinus or jugular thrombosis, with 3 deaths—12 per cent., and 22 recoveries—88 per cent.

3 cases were operated upon the mastoid only; 2 cured which leaves

22 cases operated on the sinus or jugular vein, with 3 deaths—13.6 per cent. and 19 recoveries—86.4 per cent.

10 operated upon the sinus, with 10 recoveries—100 per cent.

12 operated upon the jugular vein, with 3 deaths—25 per cent. and 9 recoveries—75 per cent.

From what has been said, the following conclusions are reached:

I. Metastatic pyemia due to so-called osteophlebitis or direct resorption from osseous structure is not conclusively proven; it is at all events rare and is of no practical importance and demands no special regard in our therapeutic procedures.

II. As sources of infection in pyemia we must differentiate and eliminate, either the sinus or the jugular bulb, when the former has been found without infection.

III. When a febrile condition exists with indications from opening the mastoid, the sinus should be laid bare.

SPECIAL INDICATIONS FOR OPERATING ON THE BLOOD-VESSELS.

I. Jugular ligation should be the first act of the operation:

1. When there is no doubt of the existence of jugular phlebitis or

2. When grave septic or septicopyemic symptoms are present.

II. Jugular ligation should be made after exposing the sinus:

1. When the sinus seems normal, without perisinuous

disease and when the pyemic process shows intense differences in temperature with chills.

2. When a phlebitis or wall-lining thrombosis is accompanied by the above conditions.

The sinus should be opened:

1. When a septic decomposed thrombus can be demonstrated.

The result of the exploratory puncture being negative:

2. When the sinus wall seems gangrenous or

3. When repeated chills, intense fluctuations of temperature occur, or the general conditions are bad.

4. When neuritis optica exists, not, however, without exception.

III. Jugular ligation should be made after opening the sinus:

1. When the septic thrombus is or has been adjacent to the jugular bulb.

2. When, after opening the sinus, chills continue, temperature remains high or cerebral symptoms persist.

The demonstrated existence of an affection of the sinus wall or of a solid thrombus does not necessitate of itself an operation on the sinus or jugular vein. These uncomplicated diseases frequently tend to a spontaneous recovery.

Of decisive influence for or against operative procedures is the character of the general infection. The existence of an undoubted diffuse purulent meningitis forms, as yet, a contraindication to operative measures. The demonstration of pus or cocci in the fluid collected by lumbar puncture, should not deter us from operating,

XXXI.

THE NATURE OF DISCHARGES AND DOUCHES.*

By Wyatt Wingrave, M.D., London,

physician and pathologist to the hospital.

Douches and Irrigants.

Purposes.—A douche or irrigant may have for its object: (1) the mechanical removal of morbid secretions, accumulations, and foreign bodies; or it may be used (2) for antiseptic purposes; or (3) for diagnosis.

Essentials.—To effect satisfactorily these objects the douche or irrigant must conform to certain requirements which vary according to circumstances. 1. The solution employed should, when practicable, be a solvent of the substance to be removed. 2. The reagent should be itself readily soluble in water and form a clear solution. 3. It should be non-irritating to mucous membranes and sensitive surfaces. 4. To ensure thoroughness it should possess the power of penetrating the surface tissues. 5. It should be miscible—i. e., chemically compatible with the most effective antiseptics. 6. It should be economical in cost and readily available. Of these essentials perhaps the most important one is that of having the power to dissolve the discharge, since there are so many solutions in general use which not only have no such solvent action, but actually precipitate and harden the substances which they are intended to remove.

Nature and composition of discharges.—As a preliminary to choosing the materials for a douche it may be expedient to consider the nature and composition of the different discharges and accumulations which demand treatment. So far as our own field of work is concerned, they may thus be grouped: (1) catarrhal; (2) serous; (3) purulent; (4) cerumen and cholesteatomata; and (5) fibrinous and hemorrhagic.

*Clinical lecture delivered at the Central London Throat, Nose, and Ear Hospital on February 28th, 1901.

1. Catarrhal products as commonly met with in the nose and naso-pharynx and less frequently in the ear may be either viscid or inspissated to the extent of forming "crusts." Coming from mucous membrane the fluid consists chiefly of an alkaline solution of mucin, with globulin and serum albumin in proportions varying with the intensity and nature of the morbid process. Epithelial cells in varying degrees of mucoid degeneration and leucocytes, will be suspended in the fluid, together with varieties of bacteria. Of the organic constituents mucin is readily soluble in weak solutions of alkaline salts, such as bicarbonate of sodium (from 0-5 to 1 per cent.), but insoluble in acids, while cells and serum globulin are soluble in weak solutions of neutral salts, as also the nucleo-albumin of the cells, albumin being soluble in water.

2. Serous discharges rarely call for special removal except when localised. In them globulin occurs in greater proportion than mucin, therefore a neutral saline solution should be selected.

3. Pus will obviously vary considerably according to the conditions of its production and the duration of its retention. It may be thin, viscid, and even solid (caseous), sweet or fetid. According to Hoppe Seyler the proportions of organic solids in 100 parts of dried pus are: proteids, 13; nuclein, 34; fats and lecithin, 14; cholesterin; 7; cerebrin, 5; extractives, 4; and insoluble substances, 20. Halliburton gives nucleo-albumin, cell globulin, albumoses, and peptones as the chief constituents. In the fluid part or serum globulin with small quantities of serum albumin and albumoses will be found, while the organised solid or cell elements, such as leucocytes, connective tissue fragments, etc., will yield nucleo-albumin, cell globulin and nuclein, also fats, lecithin, cholesterin, etc., in varying degrees of fatty and other degeneration. All these are soluble in weak solutions of either neutral or alkaline salts respectively.

4. Cerumen may vary from a thin treacly consistence to that of a firm plug, more or less mixed with epidermal squames, hairs, parasites, dust and other foreign matter. Being fatty in nature it is readily soluble in alkaline salts. But as the duration of contact by an irrigant is so short and the plug oftentimes so dense softening by means of

a strong alkaline solution, preferably in glycerin, is often expedient as preliminary to the douche. Cholesteatomata consist of closely packed laminated squamous epithelium with fatty granules and cholesterin crystals. The cells will yield much keratin and nuclein, both of which with the fatty débris are soluble in alkalies. Sometimes, as in middle-ear suppuration, the epithelium is mixed with pus; if so the neutral salts also should be used in combination.

5. Plastic exudation consisting chiefly of filamentous fibrin entangling leucocytes in its meshes is extremely difficult of solution and rarely admits of more than a softening process by solutions of the neutral and alkaline salts, such as sodium sulphate, calcic hydrate, etc. The same applies to bloodclot, which is, however, less dense and consequently much more readily removed by similar irrigants.

Choice of material for douche.—Knowing the nature of the discharge and the solvents of its chief constituents there will be but little difficulty in selecting an efficient irrigant which shall act both chemically and mechanically. The appended table of reagents in frequent use will facilitate selection. On one side are grouped the solvents, on the other those which either actually precipitate, or at all events do not dissolve, the prevailing constituents of the discharge.

Table of Solvents and Precipitants.

Solvents.	Precipitants.
Sodium sulphate (from 1 to 2 per cent.).	Water (except albumin).
Potassium sulphate (from 1 2 per cent.).	Mercury biniodid.
Magnesium sulphate (from 1 to 2 per cent.).	Mercury perchlorid.
Ammonium sulphate (from 1 to 2 per cent.).	Alum.
Sodium bicarbonate.	Zinc chlorid.
Sodium chlorid.	Zinc sulphate.
Sodium hydrate.	Zinc permanganate.
Sodium biborate.	Potassium permanganate

Sodium sulpho-carbolate.	Hydrogen peroxid.
Calcium chlorid.	Formalin.
Calcium hydrate.	Carbolic acid.
Potassium hydrate.	Boric acid.
Potassium carbonate.	Liquor sodii chlorinat.
Chinosol.	Liquor carbonis detergens.
	Izal.
	Alcohol (fats excepted).
	Sulphurous acid.

It will thus be seen that many of the solutions which we most usually employ are not those best adapted to their purposes, since some of them—e. g., the salts of mercury, phenol, boric acid, etc.—actually coagulate or form insoluble compounds with the chief constituents of the discharge, thereby preventing thorough irrigation. One must not ignore, however, the qualification that the duration of contact between the irrigant and the discharge is often so short that either complete solution or complete precipitation of the organic elements can scarcely be expected. Still, it will generally be quite sufficient for the purpose if the matrix is dissolved and diluted so as to facilitate the division and removal of the solid and organised matter—e. g., in the case of "crusts," pus, cerumen, cholesteatomata, etc. This will obviously be more thorough when a solvent of that matrix is employed in preference to a fluid which can at the best act only mechanically. It is scarcely necessary to discuss each agent separately, yet several demand special notice.

Taking water first, this is by no means the most effective irrigant, whether employed as tap or distilled, warm or cold, since of the organic substances albumin is about the only one which it dissolves.

Next in importance are the neutral salts—sodium, potassium, magnesium and ammonium sulphates with sodium and calcium chlorids. These act as solvents of the globulin group, but vary in degree and according to the strength of solution employed. Sodium sulphate is by far the most useful, especially if employed in a strength of from 1 to 2 per cent., but if stronger—e. g., from 5 to 10 per cent. or more—it causes precipitation of proteids. It still further

has the property of penetrating organic tissues. This is well illustrated in the action of Müller's fluid (a solution of chromic salts and sodium sulphate) which not only hardens the tissue, but penetrates to its deepest part. Should the chromic parts be used alone, however, the hardening is only superficial. The quality is of the greatest value when dealing with a granulating surface and in economizing cocain.* Sodium sulphate still further has the valuable property of mixing readily with biniodid and other salts of mercury in efficient antiseptic strengths. Calcium chlorid, although not quite so good a solvent, is particularly useful as a hemostatic douche, since calcium salts play an indispensable part in the blood coagulation. Sodium carbonate is perhaps the best solvent of mucin, which forms by far the chief organic substance in catarrhal secretion; it is also a solvent of nucleo-albumins, fatty material, nuclein, keratin, etc.; its strength should be about 0.5 per cent. The same remarks apply to borax (sodium biborate), which salt has the additional advantage of possessing some antiseptic properties. Its strength should be from 0.5 to 1 per cent. Sodium, potassium, and calcium hydrate are valuable chiefly for their softening action upon the tissues and are not applicable as douches, except in very weak solutions since they form a glutinous compound with albumins known as Lieberkühn's jelly, familiar to us in the well-known "ropy" or "gelatinous" reaction between pus and liquor potasse. The first and second are useful when combined with glycerin for softening ceruminous and epidermal plugs as a preliminary to irrigation. Chinosol does not precipitate and mixes well with the neutral salts, but decomposition occurs when combined with alkalies. Distilled water is preferable to tap water.

We will now consider the behaviour of the opposite group, which apart from their purely passive and mechanical action in very weak solutions are either actual precipitants or at all events do not dissolve the matter which they are employed to remove. As before mentioned, pure water precipitates the globulins and has no solvent action upon fats; used alone, therefore, it is not an entirely efficient douche. The salts of zinc—sulphate, chlo-

*The Lancet, Dec. 8th, 1900, p. 1679.

rid and sulpho-carbolate and permanganata—are chiefly used for their astringent properties, since they form insoluble compounds with the proteids and should only be used as astringents. The same applies to alum and to potassium permanganate. The latter salt may be mixed with sodium bicarbonate or biborate and forms an excellent douche for removing fetid crusts in the nose and nasopharynx. Boric acid is perhaps one of the most favored douche agents, probably owing to its supposed antiseptic qualities, but, unfortunately, it is not a solvent of proteids and therefore does not conform to our essentials. Carbolic acid (phenol) is a powerful precipitant of the proteids; it should therefore be mixed with solutions of sodium sulphate or carbonate, when it will prove a more efficient douche. Care must always be taken that the solution is complete, otherwise the phenol will be simply suspended and will obviously cause much irritation, even pain, especially when used as a nasal douche. Imperfect solution can be avoided by using the best preparations of phenol (absolute or No. 1 carbolic acid) by boiling, by using the above salts, or by diluting glycerin of carbolic acid (P. B.). Formalin is now very popular as a douche, but it is a very powerful precipitant. Peroxid of hydrogen, unless freely diluted, has the great disadvantage of causing rapid effervescence when mixed with pus. This is extremely awkward when irrigating a cavity, such as the maxillary sinus. Izal and liquor carbonis detergens are not only precipitants, but have the further disadvantage of being emulsions and opaque, so interfering with diagnostic evidence. They are also toxic and very irritating to the mucous membranes and require great care in their use. Finally, the inorganic salts of mercury—the perchlorid and biniodid—are most powerful precipitants, readily forming insoluble compound with abumins and globulins.

In addition to its purely mechanical use a douche may be required for antiseptic purposes. But our most valuable antiseptics are precipitants of proteids and therefore not thorough irrigants; consequently it is more often expedient to irrigate first with a solvent and use the antiseptic afterward, as in the case of suppurative middle-ear disease. This need not, however, always be done, since

biniodid of mercury, phenol, chinosol, and many powerful antiseptics are not only miscible with pure sodium sulphate, but when mixed the solution do not precipitate proteids so readily as a plain solution of the antiseptic would. This is a property of no slight importance. In the use of potassium permanganate where there is much mucin, as in the crusts found in atrophic rhinitis, a combination with sodium bicarbonate or biborate will be found to afford a very efficient deodorant douche with or without sodium sulphate. Boric acid is so feeble an antiseptic, even by itself, that its combinations need no serious consideration. This, however, does not apply to chinosol, which, mixed with sodium sulphate, affords not only a clear solution, but one having high solvent and antiseptic properties. Its great disadvantage is its cost. Sanitas also mixes well with the neutral salts and its efficiency is markedly increased.

It will thus be seen that few reliable antiseptics, when used by themselves, actually conform to the essentials of a perfect douche, but when combined with a neutral salt their efficiency is undoubtedly increased, this being due in a great measure to an increase in penetrative power.

A protesting word may here be not superfluous with regard to many popular formulae combining thymol, eucalyptol, menthol, and other aromatics with various inappropriate salts which are employed as antiseptic douches. These are not only extremely irritating to the mucous membrane—especially the nasal—sometimes causing great discomfort, but they should only be recommended as deodorants and in those cases which demand stimulating as an adjuvant to the routine solvents—e. g., atrophic rhinitis. When available an economical and efficient douche in cases of atrophic and fetid rhinitis is to be found in sea water. It should be thoroughly well boiled, decanted and used at a temperature of about from 60° to 70° F. A pinch of sodium bicarbonate to the pint may be added when the crusts are very firmly adherent. When employed for diagnostic purposes the douche should be transparent and colorless, hence liquor carbonis detergens, creolin, izal, permanganates, etc., are to be avoided. Likewise, too, it is inadvisable to employ any precipitant such as mercuric chlorid for exploratory irrigation when the exit passage is

likely to be minute—e. g., per Lichtwitz cannula in the case of suspected maxillary sinus disease.

Although far from complete, the foregoing selection may be considered as fairly representative of the materials frequently employed as douches and, however true it may be that experience eventually leads us to select that which is most serviceable, the application of our knowledge of physiologic chemistry will doubtless not only facilitate that selection, but also guide us to still further improvements. While disclaiming any intention of suggesting a universal irrigant, experiments in the laboratory and clinical observation amply emphasize the fact that we have in the neutral salts, especially sodium sulphate, by far the most reliable basis for an irrigant, especially when pus predominates, but in many instances already referred to the addition of an alkaline salt will render it even more effective. Whatever formula be employed it must obviously be modified according to the clinical circumstances calling for its use and efficiency will be ensured by practically appreciating the teachings of the physiological laboratory.

The appended formulæ are based upon the foregoing principle, having all been thoroughly tested chemically and clinically, and although selected chiefly for use in connection with disease of the ear and upper respiratory tract they are equally applicable to general surgery.

Formulæ.

1. Sodium sulphate, from one and a half to three drams; water to one pint (20 fluid ounces), from 1 to 2 per cent.

2. Sodium sulphate, from one and a half to three drams; sodium bicarbonate, 40 grains; water to one pint.

3. Sodium sulphate, from one and a half to three drams; borax, 40 grains; water to one pint.

4. Sodium sulphate, from one and a half to three drams; sodium bicarbonate, 40 grains; glycerin of carbolic acid, 45 drops; water to one pint.

Note.—Instead of glycerin of carbolic, absolute phenol nine grains or No. 1 carbolic acid may be used. Heat to 155° F.

5. Borax, 40 grains; bicarbonate of soda, 40 grains: glycerin of carbolic acid, 45 drops; water to one pint (diluted Dobell's solution).

6. Sodium sulphate, one and a half drams; chinosol, 10 grains; water to one pint.

7. Sodium sulphate, one and a half drams; sanitas, three fluid drams; water to one pint.

8. Sodium sulphate, one and a half drams; perchlorid of mercury, two grains; water to one pint (1 in 5000).

9. Sodium sulphate, one and a half drams; red iodid of mercury, two grains; sodium iodid, two grains, water to one pint (1 in 5000).

10. Sodium sulphate, one and a half drams; potassium permanganate, two grains; water to one pint.

11. Sodium bicarbonate, 40 grains; potassium permanganate, two grains; water to one pint.

Note.—Borax (40 grains) may be used instead of sodium bicarbonate.

12. Solution of calcium chlorid (P. B.) six fluid drams; water to one pint.

Notes.—The pure exsiccated sulphate of sodium should always be used in preference to the ordinary crystalline salt. Bicarbonate is preferable to carbonate of sodium. Hot water whenever convenient should be employed to make the solutions. Solutions of phenol should be heated to 155 degrees. No. 1 as a simple irrigant for pus, Nos. 2 and 3 when mucus is present or when the discharge is inspissated, Nos. 4, 5, 10 and 11 for inspissated fetid mucus or "crusts," Nos. 6, 8 and 9 as antiseptics, and No. 7 and 10 as deodorants. No. 12 is chiefly employed for its hemostatic property.

Methods of Employment and Instruments.

The selection of an instrument will be guided, first, by the particular purpose for which the douche is to be employed; secondly, whether it is intended for the surgeon's or for the patient's sole use. This distinction is by no means unimportant, knowing how rarely the layman appreciates the possibility of infection and the importance of cleanliness. In this instance he is perhaps not entirely to blame, since this ordinary apparatus at his disposal—e.

g., the rubber ball, glass or metal syringes—are without doubt the most dangerous weapons ever employed. An ocular and olfactory, still more a bacterial, examination of the interior of any syringe which has been much used, will at once emphasise the truth of this statement. The cause of this is obvious: no apparatus that has to be filled by the aperture which comes in contact with the wound can escape contamination of its interior, except through special care which cannot be expected in its domestic employment. In the case of aural and nasal douches, the application to the nozzle of a short piece of rubber tubing, which can be renewed or removed and sterilized, greatly reduces the risk of infection or of injury during self-use. The ordinary form of hydrostatic douche is not liable to infection in this particular way, but it is a somewhat clumsy arrangement and not to be advised for delicate and deliberate work as in aural cleansing, since it admits of but slight variation in volume and pressure.

Dr. J. Dundas Grant's modification of the piston syringe is thoroughly efficient in guarding against septic infection, being fitted with a two-way tap which admits of filling through a separate channel (Fig. 1). This with the ordinary piston glass or metal form is, however, very difficult for the patient to use himself.

The writer's aseptic douche (Fig 2) will be found specially adapted to this purpose, since the patient not only has force, direction and volume of fluid directly under control, but by means of inlet and outlet valves, the irrigator can only be filled at the distal end like a Higginson's syringe, of which it is in fact a modification. It is very wide in its application, but is specially valuable in case of disease of the ear, requiring great care in auto-irrigation and those forms of rhinitis demanding a copious douche. The glass nasal douche (Fig. 3) is particularly useful when small quantities only are required.

It is as unnecessary to describe in detail all the numerous forms of apparatus adapted to special purposes as it is to enumerate and to condemn all those which do not conform to the most rudimentary principles of cleanliness, but it may not be unreasonable finally to emphasise that no apparatus can be safely employed in which one aperture serves both for filling and for emptying.

Fig. 1.
Two-way Syringe.

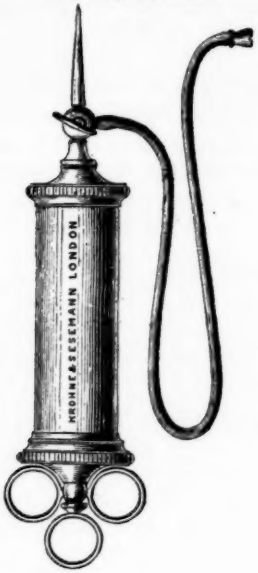

Fig. 2.
Aseptic Aural and Nasal Douche. Nozzle, showing valve.

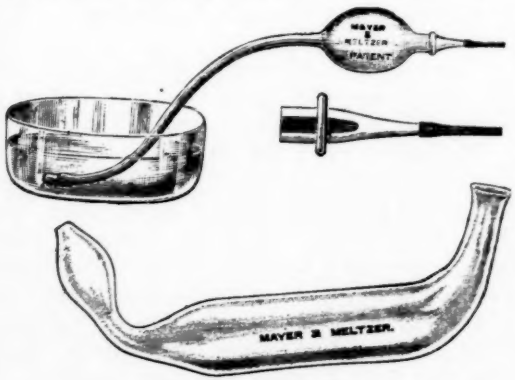

Fig. 3.
Glass Nasal Douche.

XXXII.

THREE CASES OF SIMULTANEOUS OPERATION FOR DOUBLE MASTOID ABSCESS.

By Charles W. Richardson, M.D.

WASHINGTON.

In presenting these three cases for your consideration to-day, I offer them for nothing novel in their etiology, pathology or symptomatology or surgical procedure, but for simply what they represent as three unusual surgical incidents in mastoid work. It is rather unusual, within a period of eighteen months, to have had three such surgical incidents. It is not unusual to have patients with both ears to be simultaneously affected with acute suppurative otitis, nor is it unusal for the suppuration on one side to cease and the other to terminate in mastoid abscess; nor is it unusual for the suppuration on one side to terminate in abscess and require operative intervention, and then, at a later day, the other side to require the same line of procedure; but it is rather unusual to have both ears simultaneously affected with suppurative otitis and, at an equal pace, to go through the successive steps to mastoid destruction.

On July twenty-third, nineteen hundred, I was requested by Dr. Roy to see with him a man who had an acute suppurative otitis of both middle ears for a period of two weeks. The patient was a vigorous man of forty years of age, who had never had an affection of the ear before the present attack of acute suppurative otitis. The invasion of the ears had been preceded by an attack of catarrhal influenza. There was a moderate purulent discharge from both middle ears, as well as exquisite tenderness over left mastoid antrum, extending to the tip of the process, which latter condition had existed for two days. Moderate tenderness over right mastoid was also manifest. Both membranes showed small perforations in the posterior inferior quadrant, slight sinking of the posterior superior

canal wall in left auditory canal. Temperature 99.4° Patient excited, apprehensive and nervous. A diagnosis of double mastoid abscess was made, and the necessity for immediate operation decided.

The patient was removed to the Providence Hospital, where preparation was made for the operation to be done the following day. The next morning, the day of the operation, the patient stated that the pain had completely subsided in the left side, and had become very intense upon the right side. On examination, the statement was verified. The left side was first operated upon, and a moderately broken down structure, containing pus, was exposed almost immediately on chiseling through the cortex. A loose dressing was made, and immediately thereafter the right mastoid was operated upon. As in the left mastoid, immediately after penetrating through the cortex, a moderate sized pus cavity was entered. The tip was almost normal, nevertheless taken away. After curetting out the antrum and down to apparently normal bone in all directions, something impelled me to enlarge my bone wound posteriorly, when I entered into a large pus-filled accessory antral cavity, almost as large as the bone field already exposed. This accessory cavity seemed to have no visible communication with the pus cavity previously opened. The patient was in a good condition after the operation, and made an uneventful recovery.

CASE II. On March 19, 1901, I was requested to see a young dental student under the care of Dr. Tiefenthaler, who had had a double suppurative otitis for several weeks, following an attack of influenza. I found the patient to be a young man of twenty-eight years of age, excessively pale and very deaf. On examination, I found a profuse purulent discharge from the ears, large perforations in both tympanic membranes, with slight sinking of both posterior superior canal walls. No spontaneous pain, and only slight tenderness, on pressure, over the mastoid antrum. Temperature 100°. I suggested the use of ice, frequent irrigation, and absolute rest for several days. On a subsequent visit, several days later, I suggested immediate operation, which was acceded to, and the patient was then removed to the Columbian University Hospital, where he was operated upon the following day. I first

operated on the right mastoid, which I found, on opening through the cortex, to be an extensive pus cavity from the tip to the base, and as far as the cellular structure extended posteriorly. Immediately thereafter, the left ear was operated upon, and found almost as extensively involved as the right process. The right mastoid wound was rather slow in healing, on account of the enormous cavity which was required to be filled up by granulations; otherwise, the progress of the case was continuous to perfect resolution.

CASE III. On December 24, 1901, I was requested by one of my colleagues, Dr. Vincent, of the staff of Providence Hospital, to examine a child in the contagious ward, who had had an acute suppurative otitis, following scarlet fever, for a period of ten days. The patient was a boy of six years of age, convalescing from scarlet fever. Ten days before I saw him, he had developed a double scarlatina otitis, attended with profuse discharge from both middle ears. There had been marked pain and tenderness over both mastoids from the second day of the ear invasion. The temperature for several days had been distinctly septic, with a range from 99° in the morning to between 104° and 105° in the evenings. There was exquisite tenderness over both mastoids, with slight edema. At the same time that the invasion of the ears took place, there also developed some symptoms of nephritis. On the twenty-fourth, there were only twelve ounces of urine excreted. I could not operate upon the child Christmas day, so decided to postpone the operation until the twenty-sixth. The child's condition was very serious, so it became necessary to operate as rapidly as possible. I opened up the right mastoid first, and found the process very dense. After penetrating about half an inch, I opened up a pus cavity which communicated with the antrum. The same condition was found on the left side as noted upon the right. The pus was a thin, watery and offensive liquid. The reaction was good. The highest temperature on the twenty-seventh was 102°, and the amount of urine excreted sixteen ounces. On the twenty-eighth the temperature was normal; the amount of urine excreted dropped to nine ounces. On the twenty-ninth the temperature was normal. In the early morning of this day vomiting oc-

curred, which was soon followed by convulsive seizures and complete suppression of urine. The next day, the little fellow died from nephritis. It is hardly necessary to state that all that medical science could suggest was done to aid the action of the disabled kidneys.

In presenting a paper before a society composed of skilled workers in otology, it seems almost superfluous to outline the typical symptoms indicating the advisability for operative intervention in purulent mastoid infection, nevertheless, I think it important to emphasize certain points in the symptomatology which indicate that a case presenting them has reached the stage where delay endangers life, causes unnecessary suffering, and protracts the recovery. These symptoms are great pain and tenderness over the mastoid antrum and tip, persisting for a period of forty-eight hours or more without abatement from judicious local and general treatment, attended with a profuse creamy or sanguineous purulent discharge from the auditory canal, which pus contains streptococci or pneumococci. The quicker a mastoid presenting the above conditions is opened, the less destruction of cellular elements, the less the danger of serious complication, the smaller the wound area, the shortening of the period of suffering, and the more rapid the recovery with minimal depression and scar. It is remarkable at times how rapidly destruction of mastoid cellular elements may take place. I have operated lately on three cases of single mastoid involvement which showed this to a marked degree.

In July, I operated on a man five days from the initial pain in the middle ear and found the mastoid extensively broken down and filled with pus. In November I operated on a woman six days from the initial symptom of pain in the ear, with a similar revelation as to the condition in the mastoid. Both of them were strepticocci cases. Two weeks ago I operated upon a young woman eight days after the initial ear pain and found extensive purulent involvement of the tip. This was a pneumococcus case. In performing the mastoid operation, I believe that the most radical procedure is the only safe method. It is only through opening into the antrum, opening all cellular structure, and removing the outer wall of the tip that one can safeguard

his patient against separative pus pockets, which will require secondary operations if left undisturbed. Several times in doing the mastoid operation have I found a similar condition as noted in the right mastoid of case number 1. Such a case would be incomplete unless these cavities had been opened up. In several instances, also, I have done what appeared to be a complete and thorough operation for mastoid abscess, until I chiseled off the outer surface of the tip, thus exposing cells filled with pus, and demonstrating how incomplete would the operation have been unless this procedure had been adopted.

XXXIII.

DISEASES OF THE ACCESSORY SINUSES.

By Robert C. Myles, M. D.,

NEW YORK.

The subject that has been assigned to me is a broad one. I shall treat it in an epitomized manner, giving rather a condensed statement which will chiefly embrace my experience in the treatment of this class of cases. It has been said that nothing is so unreliable as statistics, except some men who make them; nevertheless, statistical evidence is an invaluable aid to a discriminating mind and should be given preference over assertions.

The principal physiologic function of the nasal accessory cavities is to supply fluid secretion and warm air to the nose and to aid the sounding-board apparatus of the head. The usual causes of diseases of the pneumatic sinuses are to be found in bacterial activity, either primary or secondary to mechanical conditions, generally the latter, the acute infectious diseases being the greatest offender, the so-called polypoid changes second, and the pathologic changes at the root ends of the teeth, third. When we shall have perfected the art of preventive medicine, we will hear less of accessory sinus diseases; our duties will direct us to restore the nares to as near a physiologic condition as our science will permit without injuring, permanently, the structure of the nose. Serious conferences with dentists will greatly reduce our incomes from the antrums. Proper nursing and intelligent interference at the crucial time will considerably reduce the number of chronic cases. The pathologic changes vary from venous intumescence to many necrotic and formative conditions.

The diagnosis, prognosis and treatment will be considered under the individual sections. In the majority of cases of empyema of the antrum of Highmore the diagnosis is easily made. The introduction through the hiatus semilunaris of the properly curved silver irrigation tube

has enabled the writer, in the majority of cases, to settle the diagnosis at once. After using the electric light and listening to the arguments of others concerning its worthlessness, he retains and uses it as one of his valuable aids in making the diagnosis. It is not the pus which prevents the transillumination, but the swollen tissues and the blood within them. Pus in the middle meatus issues from the antrum, the anterior ethmoidal cells, or the frontal sinus, or from all of them. Placing the top of the patient's head on the floor and at the same time requiring him to blow forcibly through the suspected nostril, will demonstrate a quantity of pus in the middle meatus in many cases in which the antrum is at fault, and in which the secretion is more or less liquid. The passing of a trocar through the middle or inferior meatus will confirm the diagnosis in suspected cases in which it cannot be made by the previously mentioned methods.

But there is one class of cases in which this method will fail—those in which there are polyps, thick mucus, and colloid material. The prognosis in antrum diseases depends upon the extent and location of the pathologic changes as well as on the method of procedure adopted by the surgeon. Since it is not possible for the surgeon to anticipate the exact diseased condition before operating, nor always possible for him to determine the extent of the disease when operating, failure to obtain the best results in every case must necessarily occur. Some of the apparently worst forms of antral empyema have been cured by the extraction of a tooth and a few weeks irrigation through the socket. On the other hand the writer has seen cases of trivial discharge, the only symptoms being a moderate post-nasal catarrh, which, after a thoroughly radical operation, consisting of the removal of the anterior inferior wall of the antrum, thorough curettage of the internal walls, and gauze packing for weeks, have terminated in most obstinate purulent and insubordinate pyogenic conditions. Since we cannot obliterate the antrum without objectionable results, we must try to restore its functions without destroying too much of the lining membrane. The writer believes that he was the first to insist upon not treating the antrum according to thorough surgical principles; in other words, he believes that the

thorough curettage frequently induces a worse condition than the disease for which it is employed. It is his rule, in cases of long history and severe disease manifestations, to make large openings through the region of the canine fossa and malar ridge and counter-openings through the inferior or middle meatus, followed by a gentle and careful curettage of the mucosa and a firm and decided curettage of whatever bare bone may be found. The cavity is then packed with aristol of iodoform gauze, which has been passed through mercuric bichlorid solution. This packing is never allowed to remain longer than a week. At the expiration of this time the mucous membrane is inspected occasionally, the exuberant granulations are removed with the curette, and the cardinal principles of free drainage and free admission of air are utilized as far as the conditions of the individual case will permit, supplemented by various forms of tubing and re-incision of the membrane as it closes over its aperture. The writer from time to time has had patients who apparently were cured by treatment through a natural opening, but these evidently were cases in which purulent semi-decayed collections had formed and acted as a leaven to perpetuate the suppurating foci.

In frontal sinus cases the diagnosis at time is extremely difficult, but, as a rule, the silver irrigation tube can be inserted into the sinus and an injection of normal salt solution makes the diagnosis clear by bringing away a quantity of purulent matter. In the severer types of these cases the headaches which come on in the morning and pass off in the afternoon are almost pathognomonic. This headache may be explained by the fact that the gas, which, during the night, escapes through the infundibulum, ceases to do so when the patient assumes the upright position, and gravity fills the infundibulum with muco-purulent matter. By the afternoon the pressure of the gas has forced the muco-pus through the naso-frontal canal or infundibulum, when the gas escapes and the headache ceases.

The writer has been accustomed to employ three methods of treatment. The first consists of the total obliteration of the sinus, either by removing the anterior inferior frontal sinus wall and every vestige of the mucous

membrane of the sinuses, the cavity then being packed with gauze. This method succeeds brilliantly in cases of small sinuses, but in those patients in whom sinuses are large and extend outward and backward above the orbital cavity, the treatment is tedious, slow and unsatisfactory. The second method is utilized in cases of large sinuses. Part of the anterior wall is removed, careful curetting of the mucosa and bare bone is employed, and as large an opening as is feasible is made from the sinus to the nose with an especially constructed trephine and chisel. Special efforts are made to remove those portions of the nasal process of the superior maxillary bone which forms a part of the floor of the frontal sinus. It has been the custom of the writer to endeavor to relieve all forms of acute and chronic frontal sinusitis by removing the anterior end of the middle turbinal, and a part of the anterior ethmoidal cells, as well as the lower walls of the naso-frontal canal and infundibulum. This was formerly done as a preliminary step in cases in which external operation was intended, but so many cures resulted from this procedure that he now employs it as the first step in the treatment, with the hope of effecting a cure through this avenue; if this fails, it makes the external operation easier and more effective.

The diagnosis of ethmoidal cell disease is usually so easily made that "he who runs may read." In cases of latent empyema in the individual cells, the diagnosis is frequently not made until the patient has been under observation for some time. The writer has found the soft silver probe invaluable in ascertaining the conditions of the respective cells. In nearly every case it is wiser to remove a part or all of the middle turbinal at the outset. In the polypoid cases all visible polypoid tissue has been taken away with the excisor forceps or snare, and the floors of the sinuses removed with especially constructed guarded trephines, and with the author's lateral and antero-posterior cutting forceps. His malleable-handled curettes have proved most serviceable in removing the intra- and intercellular diseased tissue and walls. The securing of free drainage and free admission of air hold as cardinal principles here as well as in the antrum.

Diseases of the sphenoidal cells, in the writer's experi-

ence, have been the most easily diagnosed. The treatment and technique employed have been more satisfactory, and results better, than those obtained in the treatment of the other sinuses. Pus issuing from the uppermost region at which the septum joins the sphenoidal bone, and careful probing, will indicate the direction from whence it comes. Complete removal of the posterior end of the middle turbinal will usually demonstrate the point whence the pus makes its exit. The anterior upper wall should be penetrated with a guarded awl or an obtuse-angled curette. Extensive removal of the anterior wall with cutting forceps, gentle curettage, irrigation, and repeated excisions of the membrane, which forms over the openings, have cured, for the writer, the most obstinate and apparently hopeless diseased conditions of the sphenoidal sinuses.

XXXIV.

THE ETHMOIDAL CELLS.

By Eugene L. Van Sant, M.D.,

PHILADELPHIA.

The ethmoidal cells, or sinuses, from the anatomic position, are not only very liable to disease, particularly of septic or inflammatory nature; but, being situated, as they are, so close to the ostia or openings of the other nasal accessory sinuses, it is almost impossible for them to be diseased, without affecting the other sinuses; or, indeed, for the other sinuses to be diseased and to have the ethmoidal sinuses escape.

The following is a brief resumé of some of the more important of the anatomic features of the ethmodial sinuses. These cells, or sinuses, consist of a number of thin walled, cellular cavities, lying within the lateral masses of the ethmodial bone. They vary greatly in number, size and shape. Most anatomists divide them into anterior and posterior cells. This separation into two groups is made by taking the attachment of the middle turbinate bone as a line of division. All those cells communicating with the middle meatus of the nose, are called anterior ethmoidal cells; while those communicating with the superior meatus are called posterior ethmodial cells. In the disarticulated skull, many of these cells appear to be broken; but when the bones are properly articulated, they form perfect cavities. Those on the upper surface are closed in when articulated, by the depressions, or fovæ, of the ethmoidal edge of the orbital plate of the frontal bone. Those situated auteriorly are closed in by the lachrymal bone and the nasal process of superior maxillary, while inferiorly, articulation into the ethmoidal edge of the orbital plate of the superior maxillary, and posteriorly, with the lateral mass of the sphenoidal spongy bones, and the orbital process of the palate, complete the cellular structure.

The anterior cells may greatly predominate over the posterior cells, and reach far backward; or the opposite condition may prevail and the posterior cells reach far forward.

The number in each group varies greatly, although there are generally more of the anterior than of the posterior cells. The anterior cells usually communicate with the middle meatus by several ostia.

Some of these ostia open into the infundibulum on its outer and posterior aspect. These are sometimes spoken of as "infundibular cells." Others communicate directly with the middle meatus, and open into the groove of the semilunar hiatus, below the line of the origin of the middle turbinated bone.

The posterior cells frequently have but one ostium, although there may be two or more. The posterior openings are usually larger than those of the anterior cells. They communicate with the superior meatus, above the middle turbinated bone, and lie deeply, being concealed by the overhanging edge of the superior turbinate body.

Occasionally, an additional ostium is found in the incisura ethmoidalis superior. This is usually found when a so-called spheno-ethmoidal cell is present. Particular attention should be directed to certain ethmoidal cells that at times are found lying very close to the other accessory sinuses. Thus, occasionally, the roof of the maxillary antrum contains one or more air cells which, in the articulated skull, complete certain of the ethmoidal cells. These have been called "maxillo-ethmoidal cells." Again, we may find an upward and forward development of ethmoidal cells toward the cavity of the frontal sinus, making a distinct prominence on the floor of that sinus, to which prominence the name of bulla frontales (Lathrop), has been applied. These cells that protrude thus forward and are situated close to the floor of the frontal sinus are known as the "fronto-ethmoidal cells."

Again, we may find a posterior ethmoidal cell projecting backward into the body and lesser wing of the sphenoid bone, encroaching upon a region of the sphenoid sinus. These cells are called spheno-ethmoidal cells. From their intimate relation, it may be readily seen how diseases, affecting these maxillo-ethmoidal, fronto-eth-

moidal cells, or spheno-ethnoidal cell would soon affect the cavities to which they are so closely joined.

Situated in the hiatus semilunaris is a rounded bony prominence named by Zuckerkandl "the ethmoidal bulla." Its size varies, and greatly influences the width of the semilunar hiatus. It contains one or more ethmoidal cells, which communicate directly with the middle meatus by an ostium, on its superior aspect. From the position of its ostium, drainage from the interior of the ethmoidal bulla is necessarily imperfect.

The ethmoidal cells are lined by a thin muco-periosteal membrane, containing mucous glands and covered by a layer of ciliated epithelium. The intermediate position of the ethmoidal cells, being posteriorly in close contact with the sphenoidal, and anteriorly with the frontal sinus—the opening of the anterior cells being so close to the frontal and antral ostia, and the upper antral wall being so largely composed of the ethmoid bone, all render them very liable to extension of diseases from and to the other sinuses.

Moreover, the situation of the ethmoidal cells, and the fact of their multiplicity, make them particularly liable to extension of septic or inflammatory diseases from the nasal chambers, and to occlusion of their ostia by local turgescence, growths, or foreign bodies.

The ethmoidal cells may be affected by a local expression of certain specific inflammations (syphilis, tuberculosis, etc.). When this is the case, appropriate local treatment is no less necessary, such as applications to ulcerations, removal of necrotic bone, etc., but the main reliance must be upon remedial measures directed to the general disease.

The ethmoidal cells may be the seat of new growths. Of these, myxomata are the more commonly found. Cases of fibromata, sarcomata and carcinomata have been reported. The treatment consists, whenever possible, of the thorough removal of the growth. It occasionally occurs that a malignant growth from the cells is mistaken for a polyp. One instance occurred in a case in a town near Philadelphia, in which the physician in charge removed part of a sarcoma, under the impression that he was removing a polypus. Uncontrollable hemorrhage followed, and two days later the patient was brought to me in Philadelphia.

At that time he was nearly exsanguined and fainted while being examined; but anterior and posterior nasal plugs, hypodermoclyses of large quantities of normal salt solution, with rest and appropriate general treatment, revived him, only, however, to be followed by a fatal result about two weeks later, owing to the rapid growth of the tumor, involving the frontal sinus and orbit, with metastases to the brain. It is very probable that the inflammation produced by the operation, and the lessened vital resistance of the patient, from the hemorrhage, had caused the rapid extension of the growth.

Catarrhal and suppurative inflammation of the ethmoidal cells, are the conditions that most frequently demand our attention. These are very prevalent, and frequently exist unsuspected. There is no doubt that many cases of acute and chronic rhinitis, of purulent rhinitis in children, and of atrophic rhinitis, are accompanied and sustained by associated lesions of the ethmoidal sinuses. Again, as previously pointed out, it is unusual to have an inflammation continue long in the neighboring accessory sinuses, without involvement of the ethmoidal cells.

Catarrhal inflammation of the ethmoidal cells is usually associated with an acute rhinitis. More rarely, it occurs during the course of certain infectious diseases, such as measles, scarlet fever, typhoid fever, pneumonia, diphtheria, etc. Influenza is a very frequent cause.

In acute catarrhal inflammation, the mucosa is reddened, swollen and congested, being infiltrated with round cells, and is accompanied by a profuse, sèrous exudation. This condition may soon subside and be followed by resolution; or continuing, may become chronic, and later take on a suppurative condition. The clinical symptoms are ill-defined, consisting mainly in a greater severity of pain and discomfort than usually accompanies a rhinitis. At times, careful examination will reveal a catarrhal discharge proceeding directly from the cells. Should these ostia of the cells become obstructed, and the exudation be retained under tension—the symptoms are greatly aggravated; and deep-seated pains may be felt over the root of the nose, or be referred to the posterior region of the orbit. If the posterior cells are involved, the patient is apt to refer the pain also to the temporal region. Acute

catarrhal inflammation of the ethmoidal cells usually ends in resolution. Treatment is directed to the nasal inflammation present—rest, purgation; application of hot water over the nose and face; and cleaning of the nose with warm alkaline washes, give much relief. When associated with an acute rhinitis, I have seen good results from the internal exhibition of the following prescription.

℞ Acetanilid.....gr ij.
Compound Morphin Powder.....gr j.
Bromid of Soda.....grs v.

Given every hour until 4 or 6 doses are taken. Should the secretions be retained within the cells, efforts should be made to promote drainage by opening their ostia; or, if the distension be great, free incisions should be made.

If the catarrhal inflammation takes on a chronic form, it is apt to become suppurative, through secondary bacterial infection.

Suppurative inflammation of the ethmoidal cells may be acute or chronic, and either condition can be further modified by obstruction of the ostia, leading to confinement of the secretion within the cells.

Acute suppurative ethmoiditis presents the same general etiology as the acute catarrhal inflammation of the cells. Influenza of late years has been a very frequent cause, the infecting agent being of the mixed character. Traumatism and operative procedures in the nasal chambers may at times be followed by acute suppuration of the ethmoidal cells. The symptoms and treatment are about the same as for the acute catarrhal variety. The pain, however, is apt to be more severe and, if the pus is confined, early incision is imperative in order to prevent the invasion of the neighboring cavities.

Most cases of suppurative ethmoiditis, however, present themselves when the condition is already a chronic one. Chronic suppurative ethmoiditis, as already stated, may be the sequence of a previous simple material condition that has become infected with pus organisms. Obstruction of the nasal chambers, from growths, deflection of the nasal septum, or other morbid intra-nasal conditions, by causing a chronic congestion of the lining mucosa and retaining secretions, are very frequent causes. The ab-

normal width in the unobstructed nostril, in cases of nasal septal deflection and in atrophic rhinitis, particularly exposes the ethmoidal cells of the corresponding side, and leads to chronic suppuration within them. Syphilis, especially in the tertiary stage, scrofula and tuberculosis are important factors in the causation of chronic purulent ethmoiditis. Foreign bodies in the nose are also a cause.

In chronic suppuration, the mucous membrane lining the sinuses, becomes thickened, frequently presenting a boggy, swollen and gelatinous appearance. Granulations and soft polypoid processes, not infrequently spring up from the mucous membrane. This swelling of the membrane may effectively block the openings of the sinuses. Later, the bony partitions between the cells necrose, and come away mixed with the secretion in delicate particles.

Symptoms. Quite a number of cases of purulent ethmoiditis show but few symptoms, except a slight chronic, nasal discharge. Such cases have been spoken of as "latent empyemas."

Usually, in addition to the discharge, the patient complains of more or less constant pain, which is usually referred to the forehead or post-region of the orbit, or to the temporal region. Not infrequently a diffuse, dull, heavy feeling in the head is complained of. The pain is greatly increased by retention of the secretion, under pressure. It is the writer's opinion that although complete retention, in cases of suppurative ethmoiditis (the so-called closed empyema), is comparatively rare, still a partial retention of the secretions is almost always present. The ostia of the cells are not well placed for constant drainage, and many cases are complicated by intra-nasal obstructions, that also may prevent good drainage from the cells. The nasal discharge is usually of a tenacious, muco-purulent character, with a creamy white appearance, but it may vary, at times being more mucoid, at times more purulent. An intercurrent rhinitis will frequently increase the discharge and cause it to become more purulent. An offensive odor to the discharge may be present, and this odor may be perceptible to the patient. The disease usually is unilateral, but both sides may be affected. The discharge, especially from the posterior cells, has a

tendency to flow back into the naso-pharynx and causes cough, hawking, dryness of the throat and huskiness of the voice. Being swallowed, it leads to digestive disturbances, and may even cause a slight, chronic, septic condition of the patient. The senses of smell and taste are frequently disturbed; being greatly lessened and, at times, absent. Rarely the patient complains of a peculiar taste to everything he eats.

Not infrequently, the patient's spirits and intellectuality are affected. Mental depression, inability to sustain prolonged mental application, or to study, may be noticed.

When retention of the pus continues, pressure symptoms, in various directions from the cells, may be present. Ocular derangement, with pressure symptom of the orbit, and its contents, is frequently noticed. Optic neuritis is not uncommon. The patient, in cases of this character, suffers from intense pain. The abscess may evacuate itself in various directions, emptying usually into the nasal chamber, or one of the other accessory sinuses. At times, it opens in the orbit, particularly at the inner angle, and we do not forget that it may empty into the anterior fossa of the skull.

The diagnosis of chronic suppurative ethmoiditis, is greatly aided by inspection, leading to the determination of the existence of a nasal discharge and its origin in the cells. At times, the removal of intra-nasal obstructions, or of the anterior end of the middle turbinal, greatly aids in the examination, and indeed may be indispensable. Careful probing may release pent-up secretion and by means of air douche, the secretion may be blown out of the cells. The frequency of involvement of the other nasal sinuses, must also be taken into consideration.

The examination is greatly aided by shrinking the nasal mucosa by topical applications of solution of cocain and adrenalin chlorid. The situation of the ostia should be remembered; and, if the posterior cells are involved, we can best determine that fact by posterior rhinoscopy.

Transillumination is not of much value in the diagnosis. In the severe cases, the retention of pus, the pressure symptoms would greatly aid the diagnosis. The prognosis of chronic, purulent ethmoiditis, is uncertain, and

depends greatly upon how carefully treatment is carried out.

In the treatment of chronic suppurative ethmoiditis, thorough drainage of the cells, removal of the purulent secretion, and the diseased portions of the cells, are the essential points. All intra-nasal obstructions to discharge from the cells, should be removed. The frequent association of nasal polyps with this disease, demands careful examination for their detection, and their thorough removal. In the great majority of cases, it is best to remove the anterior end of the middle turbinate; if the posterior cells are involved, the entire middle turbinate should be removed. The author's method of removing the anterior portion of the middle turbinate, is to cut through the bone, close to its attachment, with a powerful pair of scissors, or such forceps as the Grunwald's nasal forceps, and then with the cold wire snare remove the entire anterior portion. Application of solution of cocain and adrenalin chlorid greatly facilitates the procedure. After removal of all nasal obstructions, and the necessary part of the middle turbinate, the cells should be examined, and if found necrotic, or filled with granulations, thorough curettement should be done. For this purpose, a ring knife or the Myles or Bryan curette, or the Grunwald forceps, may be recommended.

In order to check the bleeding, and to prevent secondary hemorrhage, it is well to lightly pack the part after the operation, with small strips of gauze. These may, if necessary, be saturated with a styptic solution, soaked in a ten per cent. solution of alumnol.

Syringing the cells with a current of hot air is very advantageous, by removing secretions from the cells, and lessening the congestion of the lining membrane. The author's hot-air syringe is well adapted for this purpose. A plan of treatment that has given the writer a number of favorable results, is to remove any nasal obstruction as well as the anterior portion of the middle turbinate. Then later, when the site of the operations is healed, to continue the treatment by syringing the cells with hot-air, and by means of a Blake's inner ear syringe to inject antiseptic solutions into them. Of such solutions, a 5 per

cent. watery solution of protargol, and 10 per cent. to 20 per cent. solution of ichthyol, may be recommended.

The patient should frequently douche the nose with a warm, mild, antiseptic solution, to remove all secretions, and promote drainage.

Hot water applications, over the root of the nose and face, also seem to be of benefit, and they certainly give much comfort to the patient.

The patient's general condition should be looked after. All digestive disturbances, constipation, etc., should be corrected. Should syphilis or gout be present, appropriate general treatment is necessary.

In a number of cases, after establishing drainage, etc., I have found a change of air very beneficial to the patient, such as a prolonged stay at the seashore, or in the mountains.

In those severe cases, associated with orbital abscess, or where a fistula has been formed, an external cutting operation is usually required. The fistula should be enlarged and the diseased ethmoidal cells opened.

If found necessary, the ethmoidal labyrinth may be opened by prolonging the usual external incision, made in opening the frontal sinus, downward, toward the inner canthus of the eye. The periosteum, along with the soft parts, should be raised, and the inner wall of the orbit exposed. The communication into the cells sought for, and a free passage should be established into the nasal chambers.

The possibility of involvement of the other sinuses, in the suppurative process, should be borne in mind, and if present, appropriate operative measures should be taken, in order to prevent re-infection of the ethmoidal cells, and make the relief permanent.

XXXV.

PROGNOSIS IN CHRONIC CATARRH OF THE THROAT AND EAR. SOME REMARKS BY A WOULD NOT BE PESSIMIST.

By Thomas J. Harris, M. D.,

NEW YORK.

What are you accomplishing in your cases of catarrhal disease of the throat and ear? What degree of success are you really attaining? This is a question which the writer often hears asked and is deserving one most honest, candid consideration. Let us at the very outset say that the brilliant and altogether gratifying results achieved in acute affections of this region are not for a moment called in question nor yet the marvelous progress made in suppurative disease of the ear or the accessory sinuses of the nose. It is that large group of cases which, for lack of a better term, we refer to as chronic aural or chronic nasal catarrh, that in our judgment deserve a frank soul to soul discussion.

These cases come to us all. They form indeed a great share of our clientele in spite of the fact that the frequency of reports of large operations at our various meetings would lend to give a contrary impression. So I ask if we are all getting the results we want, or if we ever get discouraged? It is said, a man may repeat an erroneous statement so often that in time he comes to believe it true. Is it possible that some of us, in our commendable zeal to encourage our patients, come to believe that we are securing the results that we would like to have? Statistics are proverbially misleading and never more so than in regard to results of treatments. We are all liable to the common error of generalizing from one or two individual cases. Some of my hearers, as I now read, have in mind and are prepared to report some satisfactory result as the result of the treatment to the ear. But what of the ninety and nine cases which did not improve? What we are seek-

ing to-day are not your exceptional, but your average results, covering a period of years. Another possible source of error, whether in our hospital or office records, is our inability to keep our cases under observation. Improvement takes place as a result of treatment and we record him as cured or benefited. Too often he drops out of sight and appears later in some other institution with all his improvement lost and the history that as soon as he stopped treatment he began to get worse.

Let us consider for a few moments now, the large group of cases known as aural catarrh. For our purpose we do not need to go into the pathology of this affection nor do we need to deny that catarrh is at the best an indefinite term. We all know that as a result and often hand in hand with the exudative process, bands of thickening and adhesions are thrown out all over the tympanic cavity. When this has taken place and the adhesions are fully organized, what promise of success in affecting a cure of the catarrh is there? The two symptoms of the disease are deafness and tinnitus. As to tinnitus who will deny that we are still seeking for a cure and that in many instances it is impossible to relieve it. In combatting the deafness our success is greater, but we again ask how often is the improvement maintained, unless the case is continually under treatment!

Any question along the line of therapy brings to mind at once the classical methods of Politzer. We use them: But are they as satisfactory as we were formerly wont to believe? We establish the patency of the tube by catheter or otherwise when it is closed—what ground is there for believing we will be able to keep it open? Does not the cause of the catarrh reside back of the tube? And even in a patent tube how can we confidently hope that air or even oil or vapor will dissolve the adhesive bands when well organized. In this relation any form of treatment to the tube, even as promising a procedure as the use of the electric bougie, must fail. The cause of the stenosis has not been reached. So firm is he in his belief in the futility of all local measures addressed to the ear per tubam, that the Nestor of aurists in this country, Dr. Herman Knapp, informed the writer that he had entirely abandoned the use of the catheter and not a few aurists agree with

him in this. Of that other mode of local therapy, measures addressed to the middle ear by the auditory canal, there seems to be equal skepticism on the part of some of our best men. Dr. Clarence J. Blake stated recently before the Otological Section of the New York Academy of Medicine that except in a very few cases, massage to the drum membrane was not advisable and was liable to do much harm. This leaves only surgical measures and we all agree that while much has been expected from these and claimed for them, in the hands of most of us who have tried them, they are disappointing.

The discouraging outlook in these cases is acknowledged by as strong a believer in radical measures as Dench, who, in his Diseases of the Ear, says: "If the impairment of function is considerable in a patient under thirty we can scarcely hope for great improvement except by the employment of the most radical means at our command." Our most promising field for work seems to lie in combatting the cause, which it is generally agreed, is found in a majority of cases in the nose or naso-pharynx. This seems most rational, and such treatment to-day forms a constant part of every aurist's work. But are the results equally sure? Granted that your upper respiratory tract is put in healthy condition, will this influence the evil already done to the ossicular chain and drum membrane through adhesions? Or, how can any nasal treatment hope to influence that slow insidious process, often without any complaint on the part of the patient as regards the nose, which results in an anchylosis of the stapes.

When we turn to consider catarrh of the nose and throat, pure and simple, the result of our special work at first sight seems much more gratifying. It would be foolhardy to gainsay that all of us have had the most encouraging results in our surgical work toward relieving the symptoms of catarrh. Who has not seen just the relief desired come from the removal of a spur! But is it always the case? Here again as in aural catarrh we are too often seeing the results and some remoter cause. It is rather to your failures that we would point if you have any. The personal equation here, as elsewhere, enters into the severity of the symptoms. Long since the writer has abandoned judging the intensity of the symptoms,

either of the nose or throat, from the clinical picture. Over and over again we see most marked pathologic conditions with little or no complaint, and again great and persistent distress exists with little recognizable local disturbance. There is no more common error than to associate cause and result between some distressing symptoms and a local abnormality.

It is almost impossible to believe that marked nasal obstruction can exist for years without producing symptoms referable to ear or throat, and yet we constantly meet patients with prominent spurs or deflections with little or no complaint. As Dr. Wright once said: "How many a turbinated has been sacrificed in the vain hunt for a local cause."

All true prognosis depends on a successful inquiry into the cause. This is equally true in diseases of the region under discussion as elsewhere. It has just been shown that often an apparent cause is not the cause at all. Fortunate it is for surgeon and patient alike, when such is the case! When the removal of some prominent spur gives the desired relief, what satisfaction! But what shall we say of that still larger group of cases where the benefit is in whole or part lacking? In these cases it is clear that the cause is more remote or less evident and even in those cases where relief or apparent cure is effected by local treatment are we in most instances doing more by our turbinectomies, cauterization, snarings or what not, than removing the results of some remoter cause? And we ask, is such treatment alone strictly scientific. What prevents an undisturbed cause producing a like result? There is in the great majority of all cases of catarrh some general underlying cause which must be combatted. We do not forget the role that sinus involvement may play in what we call catarrh, nor the far-reaching results of the presence of adenoids in childhood. But should we stop here? What produced those adenoids years ago? Whatever physiologic grounds may be advanced for their presence (and such a reason most rational in many ways has been recently advanced by Brieger), there is, we are confident, in many cases a general constitutional cause, and unless this cause can be found and removed, all adenotomies and other operations will only temporarily avail, and the cat-

arrh will break out afresh in some new form. This case may be the so-called lymphatic diathesis. In others, and the number is not a few, it is some chronic derangement of the gastric intestinal canal. In still others, the excess of uric acid in the blood seems to be the cause. But whatever it may chance to be, our success in securing a complete and permanent cure, depends in no small measure in how accurately we recognize it. It is true that occupation and climate play their weighty role, but usually with other conditions thoroughly controlled, we can rise superior to these. Is it then speaking too positively if we say that if we get discouraged in treating these chronic affections, it is because we look too intently at the local picture and disregard the rest of the system? Or, if we consider the latter, that in too many instances we are yet unable successfully to cope with them.

For a long time the writer marveled at the relief afforded to patients who come into the hospital after an absence and said as they could not come to receive local treatment, they had been taking Dr. Somebody's tonic. Subjectively there was certainly much improvement. Objectively there was no change.

To conclude we would venture to assert, then, even with the knowledge that some confreres will differ:

(1) That our progress in the treatment of chronic catarrh of the ear has been very little (contrast the advance in diagnosis).

(2) That our chief success to-day rests in our ability in setting aside the producing nasal catarrh.

(3) That tubal therapeutics and pneumo-massage are at the best too often of temporary benefit and in the hands of some even of decided harm.

(4) That a promise to check the deafness is often all we can promise with safety.

(5) And that prophylatic measures are of greatest value, especially the early removal of the ever present adenoids.

In naso-pharyngeal catarrh we can speak more hopefully in saying, that undoubtedly in every instance it is capable of at least temporary cure by attention to some local cause, but that what seems a local cause in not a few cases is not the real cause. In many cases where a local cause does not exist, we must look for it in some general dyscrasia, the removal of which is essential to success in combatting the catarrh and that this in all instances is not possible.

XXXVI.

STENOSIS OF THE LARYNX. (ABSTRACT.)*

By J. Price-Brown, M. B.

TORONTO.

Stenosis, as a medical term, means constriction or narrowing of an opening or tube. It may exist in all degrees, from a mere diminution of the natural calibre of an organ down to complete closure. When applied to the larnyx, it implies an amount of constriction, within the cavity itself, sufficient to interfere with respiration. This interference may or may not be sufficient to endanger life. A very large majority of the cases of laryngeal stenosis which occur, are due to conditions arising within the larnyx; while the small minority owe their origin to pressure from without, occasioned by external pathologic conditions. The stenosis may not only be variable in degree, but variable in duration likewise; the conditions being in some cases temporary, in others permanent, or until relieved by medical or surgical measures.

Stenosis of the larnyx may be either congenital or acquired. The large majority of the cases are of the latter character; while the former, or pre-natal is so rare as to have been considered by some writers as non-existent. In the museum of the Royal College of Surgeons, London, no specimen can be found; and no less an authority than Mr. Bland Sutton asserts that, "the larnyx is, of all organs, the least liable to malformation."

Nevertheless cases of congenital stenosis do occasionally occur. They may be divided into the following:

1. Congenital Syphilitic Stenosis, as in the case reported by Fraenkel, in which a child three months old died of laryngeal stenosis, post mortem examination revealing necrosis of the cricoid and arytenoid cartilages and the presence of intra-laryngeal abscess.

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2. Vestibular Stenosis. This is caused by the presence of limp and collapsible vestibular walls, and is characterized by an approximation of the aryepiglottic folds and an excessive curling in of the epiglottis, producing more or less stenosis.

3. Diaphragmatic or Web Stenosis. The most severe case of this class on record was reported by Sir Felix Semon some years ago. At birth the infant's cry was weak and hoarse and attended by stridor. At the age of seven years the stridor, although always present, had improved somewhat. Later on the stridor increased again. At the age of sixteen years the larnyx was examined. The movement of the vocal cords was perfect, but between the anterior three-fourths of the cords was a symmetrical, somewhat transparent, triangular membrane. The free border was crescentic, considerably thicker than the rest of the web and white in color. The remaining opening was laterally oval and less than one-third the normal size. The borders of the membrane were attached to the cords, the latter being distinguished from the diaphragm by their greater bulk and rounded form. On attempted phonation the vocal cords came almost together; and the web appeared to form a fold below their level. The voice was hoarse, almost aphonic. The dyspnea increasing, operative treatment became imperative. As a rule, however, pre-natal web formation is of a less formidable character, being confined to the extension of a band between the anterior portions of the vocal cords. Siefert has observed and reported a remarkable series of four of these cases having occurred in one family. Chiari's case appears to be the only one recorded, out of a total number of about twenty, in which the web had formed between the posterior ends of the vocal cords.

The congenital deformities of the posterior commissure are usually in the form of bifurcations or dilatations. Morell Mackenzie reported one in which, associated with cleft palate, there was bifurcation of the epiglottis, extending downward as a distinct fissure between the arytenoids and the posterior surface of the cricoid. The epiglottis in this case formed two flaps which fell into the larnyx. From birth there were constant symptoms of laryngismus ending in suffocation at the age of four months.

A cleft in the inter-arytenoid region is usually the result of defective development. Congenital dilatations of the larnyx in the form of pouches or laryngoceles, although very rare, sometimes occur, producing stenosis by the apparent prolapse of the ventricle.

Acquired stenosis may be classed according to its cause, and may be the result of a large number of different pathologic conditions. The situation may be above, between or beneath the vocal cords, or in two or all three localities combined. There are certain symptoms common to all cases of laryngeal stenosis. All involve to a greater or less degree the power of respiration, the act of inspiration being usually affected more than that of expiration. Except in cases of acute spasm of the glottis and sudden edema, the onset is usually slow, commencing with slight interference with normal breathing, inspiration gradually becoming stridulous.

In cases of young children, it is often difficult or even impossible to obtain a laryngoscopic vision. In these cases, direct linear inspection by means of Kirstein's autoscope should accomplish a good object, by giving a direct view of the larnyx, without reversion as in the use of the laryngoscope. When the view is obtained, the appearance of the larnyx varies greatly according to the cause which produced the stenosis. As Asch has well said: "In edema we have a smooth shining swelling, differing in color according as it is produced by acute inflamation, tuberculosis or Bright's disease. In syphilis we have a ragged, deformed irregular larnyx, sometimes filled with vegetations and sometimes obstructed by membranous bands of adhesions. In cancer we find ulcerated masses, sanious and vegetating. In perichondritis the deformed condition of the larnyx and the presence of abscess point to the nature of the disease; while the appearances of polypi and of spasms or paralysis are at once observed on examination."

One characteristic symptom common to all cases of laryngeal stenosis, is the increase of dyspnea during the hours of sleep, owing to the fact that the crico-arytenoidei-postici muscles, the dilators, are withdrawn during that period from the control of the will. As the disease advances, respiration becomes more difficult, the air sup-

ply to the lungs diminishes, and oxygenation of the blood is interfered with. By-and-by the face becomes cyanotic and to save or prolong life, tracheotomy or intubation may be called for.

While the diagnosis of the existence of laryngeal stenosis may not be difficult, to ascertain the nature of the lesion which produces it in a given case may be very difficult; and will, after the period of infantile life, imperatively call for the use of the laryngoscope. If the stenosis is simply the result of contractions or adhesions, the nature of these may be readily discovered by the use of this instrument; but when excessive edema is present the cause is not so easily ascertained.

The principal pathologic conditions which produce acquired stenosis are the following:

Neuroses, which may divided into Acute Functional, Chronic Functional, and Organic.

Acute functional, in the form of spasm of the crico-arytenoidei-laterales and the arytenoideus, is of frequent occurrence in child-life. These muscles stimulated to tense activity overcome the abductor muscles, and, preventing their normal action, interfere materially with respiration. In many cases the spasm is of temporary duration—the stridor lasting for a short period, to be followed by relief—after which the old symptoms of stenosis may recur or not, according to the character of the case. The classical laryngismus stridulus or spasmodic croup is of this nature; and while very alarming to the friends of the little patient, is rarely fatal. The causes producing this condition, are usually congestion or inflmmation in some part of the respiratory tract, either subglottic or pharyngeal; while in others, the spasm is considered to be purely of a reflex character. Probably of the latter form were the two fatal cases of neurotic stenosis reported by Clement Hunter.

These cases were so unusual that they are worth recording here. The first was that of a twin boy aged 19 months. The other twin had died at the age of 1 month. The child was reported as perfectly well, when the mother lifted him out of the bed to give him his regular bath. In a fit of passion he threw his head back and ceased to breathe. His face became blue and his muscles rigid. He was put

into a hot bath but without avail, and died at once without uttering a sound.

Two days later the sister of the boy, aged 7 months, was seized in a similar manner. She had always been a healthy child. Suddenly, while lying on her mother's knee, she became rigid and blue in the face, and without uttering a sound died exactly as did her brother.

In both these cases the seizure was accompanied with carpo-pedal contractions. There was no general convulsions and in neither case had there been crowing respiration at any time. Post-mortem examination found both bodies well nourished, all the organs in a healthy condition; and neither foreign body nor obstruction in the larnyx of either. There were, however, marked signs of the presence of rickets in each—a condition said to be a strong predisposing factor in the development of spasm of the glottis.

A word here in reference to the stridor of laryngeal spasm. The crowing sound so frequently heard is the sign that the spasm is relaxing, and the air entering the partially closed glottis. When the attack is fatal, no sound is produced, as no air can enter. When an observation can be obtained during an attack of stridor, the vocal cords will be found in a state of adduction, the notch between the parallel lines being almost absent during inspiration; and presenting the form of a very narrow isosceles triangle during expiration.

Chronic functional neurosis of the larnyx. This condition may occasion a certain amount of stenosis while the neurosis continues, although it is rarely dangerous *per se*. It is a condition of general paresis of the recurrent nerve; and is supposed to be occasioned by toxic influence upon the nerve centres.

Organic neurosis of the larnyx producing stenosis. That the abductor muscles of the larnyx are always more vulnerable to organic nerve lesions than the adductors is a generally conceded fact; and many authorities go as far as Sir Felix Semon, who lays it down as a law that paralysis of the adductor is always secondary to paralysis of the abductor muscle.

Krause has advanced what is called the spasm theory;

that instead of paralysis of the abductors, it was clonic spasm of the adductors that produced the stenosis.

Grossman combats the theory of Semon, based upon a series of experiments, but his view, apparently, is not supported by adequate clinical investigation.

A contribution to the study of toxic paralysis of the larnyx, which has also a bearing upon stenosis of that organ, is given by Heymann. It contains a resume taken from fifty papers on the subject. Lead poisoning is responsible for a majority of these cases. There are also instances of paralysis arising from copper, antimony, phosphorus and arsenic; as well as cannabis indica, atropin, morphin and alcohol. In these cases, although there were exceptions, the abductor muscles were the ones that were in the main effected.

In support of Krause's view that the apparent paralysis of the abductors is really due to continued spasm of the constrictor muscles, Gougenheim and Solis-Cohen ascribe the resulting atrophy of the dilator mnscles, as reported by Bosworth, to be due to mechanical rather than paretic immobility.

Acute edema of the larnyx is an infrequent but dangerous cause of laryngeal stenosis. It is usually sudden in its development, and may occur either as a primary disease, or secondary to some other affection. It is a condition of the larnyx attended by infiltration of the submucosa, due to exosmosis from the lymphatics and blood vessels.

Primary edematous laryngitis is exceedingly rare, and may be occasioned by fractures of the cartilages, inhalations of irritating vapors, escharotics, etc., or may be due to inflammatory action in adjacent structures, abcesses, wounds, etc., or as a secondary effect from syphilis, carcinoma, tuberculosis, myxedema, syringomyelia, Bright's disease, phlegmon of the peritonsillar tissue, etc., etc.

The symptoms in acute edema are markedly laryngeal. Dyspnea and loss of voice, with pain upon movement, or upon efforts at deglutition or phonation all come on rapidly. If relief is not obtained, cyanosis, mental distress, and restlessness followed by hebetude, quickly appear; the temperature rises, and after a day or two the patient dies.

Inspection will show epiglottis and arytenoids swollen and

a view of the interior of the larnyx out of the question. In some cases all that can be observed by the use of the laryngoscope will be a distorted mass of edematous tissue.

When the disease is less acute, and owes its origin to some chronic systemic dyscrasia, the symptoms are less alarming; and although the case may be hopeless, the condition may last for weeks before producing a fatal issue.

On examining by the laryngoscope, in the milder forms of the disease, only certain parts will be found to be seriously affected; the swelling being localized about the epiglottis, arytenoids, ventricular bands or subglottic region; or some of these combined without the whole of them being distended. Lake's illustrations of laryngeal tuberculosis are good examples of this kind.

The color of the mucous membrane in edema varies from a grayish pink to a bright red—the tissues are full and rounded, and the membrane bright and glittering. There is usually copious secretion; though it is not necessarily of a purulent character, if the mucosa has not been broken.

Stenosis of the larynx from the presence of pseudomembrane is of frequent occurrence. This usually takes the form of laryngeal diphtheria, being an extension of the disease downward from the pharynx. When the false membrane is deposited upon the laryngeal walls it lessens the capacity of the organ, thereby diminishing the power of respiration. Sometimes false membrane has been formed within the larynx as the result of swallowing hot or caustic fluids.

Perichondritis as the result of fracture, simple or compound, will occasion stenosis of a severe character. The latter is particularly liable to be fatal, probably more so than incised wounds of the organ.

When perichondritis is the result of specific disease, such as syphilis, tuberculosis, actinomycosis, glanders, etc., it is usually accompanied by swelling with streptococcal, staphylococcal or pneumococcal invasion. Purulent infiltration follows, dissecting the perichondrium from the cartilage, producing necrosis and rapidly developing abscess formation. The result is usually extreme stenosis In the majority of instances of perichondritis due to typhoid fever the infection and inflammatory action are similar to those

seen in abscess formation, which, making for the point of least resistance, open in ulceration on the mucous surface. The typhoid bacillus is usually present in the necrotic mass.

What Lake terms acute fulminating perichondritis of tuberculosis is accompanied by all the signs of acute edematous laryngitis with high fever and severe stenosis, demanding immediate tracheotomy; while the chronic variety produces less stenosis, as by slower action, ulceration, exfoliation and expectoration of necrosed cartilage, follow each other in regular order.

In perichondrial abscess of the cricoid, the stenosis is most severe and the danger imminent, owing to the greater swelling which occurs in this region. When several cartilages are involved, the prognosis is most unfavorable. In nearly all cases, however, life might be prolonged if tracheotomy were performed early in the disease. The presence of a purulent sac within the larnyx would preclude the advisability of intubation.

What Gerhardt terms "chorditis inferior hypertrophica" owing to the fact that it is attended with local subglottic hypertrophies, sometimes occurs, and may be productive of a serious degree of laryngeal stenosis. The "chronic blennorrhea of Stoerck" likewise produces hypertrophies and cicatrices, but on the vocal cords instead of beneath them. Klebs says that histologically the elements in blennorrhea resemble those of rhinoscleroma. It is a question whether both conditions are not of the nature of pachydermia. When cicatrization takes place in the subglottic hypertrophy it assumes the form of a firm, white, glistening membrane, sometimes completely encircling the sub-glottic ring of the larnyx, producing more or less permanent stenosis. Cicatricial bands in blennorrhea chronica may produce a similar result.

Cicatrices are scars left by the healing process after destruction or injury of normal tissue. Hence these can only occur when nature makes an effort to repair the organism, parts of which either from disease or injury have been destroyed. The formation of scar-tissue is a pathologic process of a purely provisional character, the tendency after development being toward constant contraction. Consequently when cicatrices occur in the larnyx, the

stenosis which they occasion is more likely to increase than diminish.

Syphilis when it occurs in the larynx is, of all constitutional diseases, the most likely to be followed by cicatricial stenosis. This never occurs, however, in the early stages but in the tertiary period, years after the original infection. It is then that the gummy syphilide of Fournier and deep ulceration summarily destroy the tissues; and it is nature's effort to repair the wholesale destruction that produces the cicatrization. The parts usually affected first are the epiglottis and arytenoids. Still no region of the larynx can be considered free from the possibility of infection. The tendency is to gradually extend to the surrounding tissues. When the cartilages are partially or wholly destroyed, they make their way through the ulcerated surfaces of the mucous membrane, being discharged intralaryngeally, rarely through the external wall.

Lupus also gives rise to stenosis by the formation of cicatricial tissue. The narrowing of the laryngeal lumen due to cicatricial contraction in an old case of lupus is characterized by a general matting together of the parts until the opening may be almost obliterated. There are several instances on record of this character. The tissues are usually anemic, except when small red nodules give evidance of acute inflammation.

Leprosy of the larynx is always attended by more or less dyspnea; stenosis of the glottis being a prominent feature whenever the larynx is attacked. Phineas Abraham reports a case in which the glottis was reduced to the size of a duck-quill, necessitating tracheotomy to prolong the life of the patient.

Tuberculosis of the larynx is frequently the cause of stenosis, and may occur in several ways. Perhaps the most frequent is in the form of submucous infiltration of the epiglottis and arytenoids as shown by Lake. Paralysis of the vocal cords due to glandular pressure upon the recurrent nerve is of not unusual occurrence. Hyperplastic formation within the larynx, immobility of the arytenoids, from anchylosis of the articulation, granulomata, and papillomata, may any of them so lessen the lumen of the larynx as to produce stenosis. It may be safely said, however, that cicatricial stenosis never occurs in tubercu-

losis of the larynx. The whole tendency of the disease is toward destruction. Repair after surgical measures does sometimes occur; but the prior destruction in these cases is never so great as to seriously lessen the size of the cavity after the process of healing is accomplished.

Glanders sometimes attacks the human subject. When it does the larynx is often affected. Simultaneously with the development of tubercles and ulcers in the respiration tract, infiltration takes place in the laryngeal mucous membrane. Secondary edema may give rise to dyspnea; and when healing occurs, contraction of cicatrices may give rise to severe and permanent stenosis.

Leucocythemia. Otto Barwick and Eppinger throw new light upon the pathologic condition of the larynx induced by this disease. In the parts rich in glands, especially the epiglottis and false cords, catarrh occurs with swelling of the mucous membrane. Small lymph tubercles may form throughout the lining membrane of the larynx, and the tops of these may ulcerate. While blood-cells accumulate in large numbers in bloodvessels, the characteristic infiltration takes place in the form of small islands, which have been termed leukemic infarctions. When the tubercles or nodules are in exposed parts, they readily break down by ulceration and hemorrhage occurs from them. The most important of clinical features is the laryngeal stenosis, which the diffuse leucocythemic infiltration sometimes produces. In some cases this infiltration comes on very rapidly; and is followed by death in a very few weeks.

Gout is sometimes the cause of serious spasm of the larynx. Watson Williams reports a case of this nature; as also does Allbritt.

Benign tumors of the larnyx give rise to more or less stenosis according to their character and location. They rarely, in the adult, attain a size great enough to endanger life, although involvement may be sufficient to materially impede respiration. Of all forms of neoplasm occurring in this region, papillomata are the most frequent. They occur at all ages. In adult life they are usually discrete or single, and although they may give rise to serious symtoms, they are rarely the cause of severe stenosis. Multiple papillomata, on the other hand, occur most frequently

in young children, sometimes studding the vocal cords and the whole interior of the larynx, and seriously interfering with respiration. Some authorities look upon the presence of adenoids in the nasopharynx as the chief cause. Quinton says that in 31 cases of papillomata in children and young adults, he found adenoids in all but three. The contact of the dry and often dusty atmosphere with the tender mucous membrane of the larynx in mouth breathing, is supposed to be the irritating cause of the formation of these growths. Many authorities give over 50 per cent., as the proportion which papillomata bear to all other neoplasms of the larynx including both benign and malignant. Next in frequency come fibromata. They occur singly as also do myxomata, fibro-myxomata, angiomata, lipomata, adenomata, cystomata, etc. The two latter are exceedingly rare. The symptoms produced by all these growths are very much alike, varying according to the size and position of the neoplasm. It takes a larger growth to produce stenosis in the supraglottic than in the infraglottic region, while tumors situated upon the vocal cords, although smaller than in the localities mentioned, are much more likely to produce spasmodic stenosis.

The discovery of the neoplasm can only be made by the use of either the laryngoscope or autoscope; and the nature in many cases only by microscopic examination of a minute section of the pathologic body.

The prognosis in benign growths is rarely unfavorable. They can usully be removed by endolaryngeal methods; and in the case of multiple papillomata of children, which bears so large a place in the sum total of cases, they will shrivel and exfoliate or be absorbed, when by surgical treatment, the mucous membrane of the larynx is relieved of the irritation of respiration.

Malignant disease. This may occur in different types, all being histologically the same as when found in other organs of the body. The usual form in which it occurs in the larynx is either epithelioma or encephaloma. Scirrhus and sarcoma are more rare. Encephaloid cancer is rapid in its development, and causes stenosis by filling up the interior of the larynx with an irregular, mammillated, light rose-colored, fungus mass. Epithelial cancer is

slower in development, but like the former difficult to diagnose. In early stages it resembles a large and irritable papilloma. One distinguishing feature in nearly all malignant growths is the formation of glandular enlargement in the sub-maxillary and cervical regions.

The principal laryngeal symptoms, as in the case of benign growths, are the gradual loss of voice and the presence of increasing laryngeal stenosis, but accompanied by more pain and fetor. The diagnosis will depend on physical symptoms together with laryngoscopic and microscopic examination. When visible indications become apparent, it is not always easily distinguished from syphilis and will require constitutional treatment to verify the condition. With tuberculosis it is not so likely to be confounded. The removal of a small piece of growth for microscopic examination should remove all doubt, although W. N. Mackenzie condemns a resort to this means of diagnosis, as too hazardous to the patient. As the disease advances, vegetative hypertrophies fill up the larynx, become more observable, and render the diagnosis more certain. The prognosis is always bad, the patient dying from one to several years after the inception of the disease, and not infrequently from asphyxia the result of the stenosis.

Foreign bodies within the larynx may from their presence produce stenosis. A number of such cases have been recorded, relief being obtained by their removal. In other cases the lesion caused by the foreign body notwithstanding its removal, has been followed by stenosis. Bruggisser reports the case of a man, aged 24, with a rubber plate containing two false teeth in the larynx. It was removed on the eighth day, but was followed by complete abductor paralysis; and tracheotomy had to be performed to relieve the stenosis. Kiaer relates the case of a man who died of laryngeal and pulmonary tuberculosis. He had suffered much from stenosis. On post-mortem examination, a tooth was found in the distended ventricle of Morgagni. It had probably fallen into the larynx after extraction and had been coughed into the ventricle. Its presence may have been the primary cause of the fatal disease.

Laryngeal stenosis from external causes is due to compression upon the larynx. Probably the most common

cause is goitre, particularly the enlargement of the central lobe or isthmus. In exopthalmic goitre this is particularly noticeable. In some cases the stenosis from compression is so great that the recumbent posture has to be abandoned and the sitting one assumed even during sleep. Abscess, aneurysm, enlarged scrofulous glands, and neoplasm in the region of the larynx, may any of them produce compression upon the larynx sufficient to induce stenosis; and in some cases the extension of portions of the morbid growth to the interior of the larynx has aided much in producing this condition.

XXXVII.

REPORT OF A CASE OF THYROID GLAND TUMOR IN THE LARYNX.*

By Walter A. Wells, M.D.,

WASHINGTON.

Although it is generally the aggregation of clinical observations—their numerical strength—which gives to them scientific value, nevertheless, for special reasons, we are sometimes deemed justified in making report of a single isolated case. This is generally thought to be allowable when the case in question is either extremely rare or unusual in some respects, or if it present features which seem to throw light upon some unsettled pathologic questions, or if (as even single cases sometimes do), it permits the deduction of certain practical conclusions.

The case which I shall here report is certainly entitled to the claim of rarity. Freer, in the Journal of the American Medical Association for March 30th, 1900, has summed up the literature of cases of normal thyroid tissue in the larynx, and has himself reported the ninth case on record of this interesting group. That malignant growths penetrating the larynx are also little numerous is evident from the circumstance that I could find not more than a dozen references to cases of this kind in the very comprehensive index of the Surgeon-General's Library.

In addition to the rarity of the case I here report, it presents certain peculiarities which I think are not without interest in their bearing upon the pathology of this subject. One of these is the question which has been much mooted, at least with regard to normal thyroid tissue in the larynx, whether or not they are true accessory glands of embryologic origin, or whether they are due merely to the extension of the growth inward through the trachea.

A second point of interest is one relating to the malig-

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nancy of these thyroid growths. In my case, a marked inconsistency is to be noted between the histologic report and the clinical history, inasmuch as three years ago a microscopic diagnosis of adeno-carcinoma was made and nevertheless the patient seems to be in as good general health to-day as ever. Still another feature of the case here reported, which may perhaps have some practical interest, was the fact that I made use, in operating upon the growth, of the hemostatic effects of gelatin—and apparently with most excellent results.

Clinical History. Mrs. D., aged 50, had been for about ten years the subject of a goitrous enlargement or struma of the neck, with which had been associated no symptoms of consequence except a difficulty of swallowing.

In the past two months two new symptoms having rather suddenly developed, viz: dyspnea and hemorrhage from the throat, the patient, at the instance of Dr. Barton, consulted me for the first time in August, 1899.

Questioned as to family history, the patient claims to have come of healthy stock, that no one of immediate relatives had goitre, nor had been the subject of cancer. Her mother, who had died at an advanced age, was afflicted with asthma. One of her sisters suffered a great deal from headaches. There was no history of hemophilia in the family, so far as known.

The patient herself had been generally healthy, with the exception that she had suffered some from headaches, and a bronchitis which often came on in the winter, but cleared up completely in a short while. A cold would occasionally fall upon the throat, giving rise to hoarseness.

There is an indefinite history of syphilitic infection, for which patient was treated six or eight years ago.

In the winter of 1895, she underwent the operation of hysterectomy at Columbia Hospital. A few days after the operation, a violent secondary hemorrhage took place. The patient was completely exsanguinated and resort was had to hypodermoclysis.

Again upon removing the ligatures, another profuse hemorrhage took place, which gave the physicians a great deal of concern and trouble.

A few months before coming to me symptoms had set in, apparently due to compression of trachea and esophagus.

What she complained of first and most was a sensation of choking. Swallowing was so difficult that for nearly two months she had taken nothing but liquid food, and very little of that. Deglutition was facilitated, she had learned, by assuming the reclining position.

Dyspnea was not always present, but came on somewhat paroxysmally and reached such a degree at times that tracheotomy was thought of, and probably would have been done except for the very unfavorable circumstance of so large a goitre.

The patient seldom complained of pain in the tumor itself, nor did she have pains radiating to the ear, shoulder or chest, as often complained of in malignant thyroid tumors.

In the early part of July, while making some kind of an exertion, a hemorrhage occurred from the throat and lasted for a considerable time. In two or three days, without any apparent cause, another took place, the patient claiming to have bled as much as half a pint. The hemorrhages, each time profuse and obstinate, now occurred at the rate of three or four a week for a month or more.

In the middle of August, when I first saw the patient, her weight was 140, about 30 pounds less she claimed than what it was ten years earlier. Her appetite was poor, but there was no indication of trouble with stomach or lungs.

Objective Examination. The thyroid enlargement on the outside of the neck was considerably greater on the left side than on the right, extending upward on the left side to a level of the superior border of the thyroid cartilage. In the median line it extended nearly to upper border of sternum.

It was rather hard and nodular, and the skin was adherent and the growth apparently adherent to the cartilage; the isthmus was enlarged, but the right lobe none or but little over the normal size. There were no sub-clavicular glandular enlargements.

Laryngoscopic examination disclosed a tumor occupying the superior aperture of the larynx, much larger upon the left side than upon the right.

It seemed to spring from somewhere in the ary-epiglottic region, and it pressed forward, distorting the epiglot-

tis and completely preventing a view of the laryngeal glottis.

It was of uneven, lobulated surface, somewhat deeper in color than surrounding membranes.

The mere touching of the growth with a cotton protected applicator provoked hemorrhage lasting for some hours. The removal of a small piece of tumor with forceps was followed by hemorrhage which was controlled with great difficulty and which set in again after the patient returned home, and continued for hours. As, notwithstanding the danger of hemorrhage, something had to be done because of the increasing dyspnea, I decided to operate by way of the mouth, using gelatin as a styptic.

November 5th. Piece near the epiglottis, of about the size of a hazel nut was removed by cold snare. Gelatin applied freely. Hemmorrhage moderate and by no means so great as expected.

November 22d. Another piece of same size removed, under same precautions. Hemorrhage even less than before.

December 3d and again December 7th pieces removed. Gelatin used. Hemorrhage slight.

The symptom of dyspnea was relieved considerably and the patient considerably, but on account of the continuing difficulty in swallowing, or choking, as the patient described it, it was decided to remove the enlarged thyroid on outside of neck. This was done in January, 1900, by Dr. J. Wesley Bovee.

The laryngeal tumor continued to reform, and during the spring following it was found necessary every few weeks to repeat the snaring operation. Hemorrhage, however, which had been such an alarming feature in the beginning, was now never anything extraordinary, and it was found that the gelatin could be dispensed with.

As well as could be made out by laryngoscopic examination, the tumor seemed to be a broad base growth, having its chief seat in the pyriform fossa. The electric cautery was sometimes used in order to eradicate the growth as completely as possible. The vocal cords never seemed to be involved and no view could be caught of any growth situated below the glottis.

The patient passed subsequently from under my care, but

I learned authentically that large pieces had still to be removed from time to time; that she has remained free from the most distressing symptoms of her early history, viz: dysphagia and dyspnea, and that at the present time she has her customary weight and enjoys in general, fairly good health.

Here let us insert the report of the microscopic examination, which was made with great care by Dr. Behrend, Professor of Pathology at the Georgetown Medical School.

"The tumor tissue from the throat presents a papilliferous proliferating structure, with delicate fibrous tissue stroma containing blood vessels. The papillæ are lined with cubical to short columnar cells and are from one to several layers in thickness. Here and there among the papillæ or epithelial branches are found alveoli lined with a cubical epithelium and containing a colloid substance. These structures are identical with those found in the thyroid gland and indicate the seat of the new growth. In one of the specimens the irregular and somewhat curvilinear edge of the tumor was clearly made out as advancing toward the epithelial surface of the pharynx, by an infiltration of the papilliferous offshoots of glandular tissue. A section of the thyroid tumors removed by thyroidectomy showed the characteristics of a colloid goitre. It consisted of a large number of irregular small and large alveoli containing colloid substance. Here and there small groups of cells which might represent undeveloped follicles in which there has not yet been deposited colloid material. In some of the alveoli a papilliferous growth of the epithelium could be distinguished in the interior of the alveolus. Between the aveoli in parts, long strands of epithelial tissue, which represent an atypical proliferation with a scope of delicate fibrous tissues, indicating their origin from the papillæ, originating no doubt from typical alveolar cells. Between the regions where the alveolar formation was most like the normal thyroid and the regions represented by tissues from the inner throat (where little or no characteristic alveolar structure could be made out, but where the papilliferous atypical or infiltrating cell proliferation was marked), there were all gradations. The tumor may be considered as analagous to those forms of papilliferous cystoma of the ovary, in which the pa-

pillæ break through the cyst walls, infiltrate surrounding tissue and produce metastasis. Tumors which in the beginning are benign, through extensive proliferations of the epithelium into surrounding tissue (which is a criterion of malignancy), become malignant. In the tumor under consideration, we have evidently what was, in the beginning, a colloid goitre. The epithelium here and there began to proliferate and form papillary excrescences, which finally broke through the alveolar wall to grow irregularly. Such a region of marked change evidently occurred toward the inner side of the throat, and accounts for the gradual increase in size of the growth at this point, the point of greatest adherence from the normal thyroid structure. The microscopic diagnosis is adeno-papillary carcinoma on the basis of an old colloid goitre."

Taking a rapid survey of the literature of thyroid tumors in the larynx, we meet first with that interesting group of nine cases, in which the interior of the larynx or trachea was found to be occupied by normal thyroid tissue. The first such case was reported by Ziemmsen (Speciellen Pathologie u. Therapie, Bd. IV, 1876, p. 411).

It was diagnosed in the necropsy, during life it being only known that a tumor of some kind existed in the larynx. Tracheotomy was done to relieve the dyspnea and the patient died from erysipelas. The other cases of normal thyroid in the larynx or trachea are reported by Bruns (2 cases), Heise (2 cases), Roth, Paltauf and Baurowiez and Freer (each 1 case). Another case has been reported by Radestock, but it is not accepted as one of genuine thyroid growth. It is a fact worth mentioning that four of the nine cases were discovered in the same clinic, viz: two reported by Bruns and two by his assistant, Heise, which goes to show probably that such cases are, after all, not so rare, and would be oftener seen if we but keep on the lookout for them.

The cases were mostly in patients from twenty to thirty years of age; one patient was but 15 years; one as old as 40. Six out of the nine were females, and in every case the growth was located below the vocal cords, generally at about the cricoid cartilage or the first or second ring of the trachea. In all but one case the tumor was located

posteriorily. This was the last case reported by Bruns in which it seemed to be growing from the anterior wall of the trachea.

Before the time of Paltauf these intra-tracheal growths were generally regarded as accessory thyroids, they being supposed to have originated in intra-uterine life by the aberration of portions of the thyroid gland in the course of the development of that organ.

Accessory thyroid glands have been known for many years to occur in other regions in the neighborhood of the mother gland, most commonly on the sides of the neck, at the base of the tongue, and about the hyoid region. They were mentioned as long ago as 1755 by Albert von Hallen, although the first lucid description was by the Italian, Luigi Porta (delle malatti e delle operazione della ghriandola tiroidea, Milano, 1849, p. 8), in 1849.

A number of instances are reported of accessory thyroid in the region of the trachea, between the trachea and the esophagus and surrounding the aorta, and they are not difficult to explain when we recall the manner of development of the thyroid body as it has been described by His (Entwickelung der Schildruse, Berlin (1880), and Quénu (Les arcs branchiaux chez l'homme, Paris, Thesis, 1886) and others.

In the beginning, the median part of the thyroid body is situated between the lingual tubercle which will form the body of the tongue and the 2d or 3d branchial arch which will form the root of this organ.

As the embryo develops the thyroid gland descends, leaving, as a vestige of its journey, a little narrow canal between the body and root of the tongue, known as the canal of Bochdalek or the thyroglossal duct. Little parcels of the thyroid gland become easily detached during embryonic life at a time when the thyroid has not yet attained its fibrous envelope, and most often become lodged at the location of this canal. Those tumors found lower down around the bifurcation of the trachea or arch of the aorta, are from detached pieces which the aorta has carried with it in its descent.

But it is not so easy to explain upon the embryonic theory the occurrence of thyroid tissue in the interior of the larynx or the trachea, especially as Kolliker and Lu-

schka have clearly shown that they are not formed by two halves originally separate and later united, and therefore we have no ground for supposing that the thyroid becomes included in the course of development.

It happened that in 1891 Paltauf (Beit. z. path. Anat. u. z. allg. Path., Jena, 1891, XI, 71-90), had occasion to examine, post mortem, one of these cases which had been under treatment in Prof. Schrötter's clinic. On account of the dyspnea, dilatation of the trachea was practiced, and with apparent benefit, but finally an abscess was produced in the left thyroid lobe, which ended fatally. Paltauf made very painstaking dissection in this case and was able to demonstrate that a direct connection existed between the enlarged thyroid and the intra-tracheal growth. The thyroid body was closely adherent to the trachea and it was found that the thyroid tissue had grown into the perichondrium and had invaded the interior of the trachea by its progress through the interstitial spaces between the tracheal rings.

So convincing was Paltauf's demonstration of this case, that ever since, the theory of the embryonic origin of thyroid tissue in the larynx has been abandoned, and it is generally held to be an extension of thyroid tissue from outward in through the interstitial membrane of the trachea itself. There is only the case reported by Radestock that could not be explained in this way, but as doubt exists in regard to the diagnosis, it will have to be left out of account. A much greater difficulty, however, is met with in the principles of pathology itself, inasmuch as it is contrary to our existing notions on the subject that normal tissue or tissues that had undergone only "slight colloid degeneration," should penetrate through the intact wall of an otherwise normal larynx or trachea. In two or three cases there was not even a goitrous enlargement in the neck and in the others the enlargement is expressly stated as but slight.

We ought to mention here, before taking up the subject of malignant growths of the thyroid, that Schnitzler and Chiari have described cases of so-called retropharyngeal struma or goitre, which have sometimes, as in one of the cases of Chiari, extended across the upper part of the

larynx, suggesting the possibility of like origin in the case here reported.

But outside of the fact that the growths consisted of normal thyroid tissue, they were further distinguished by the presence of a large prominent tumor in the pharynx, of which there was no sign in my patient.

Of cases of malignant tumors of the thyroid gland penetrating the larynx or trachea, I have found mention, as above-stated, of less than a dozen in the literature, although it seems likely that many more than that have not been recorded, or the references thereto have escaped my search.

The first case that I have seen recorded, is that of Chassaignac (Gaz. des hop. Par. 1849, 3, s. i, 488), who, in 1849, related the history of a patient with cancerous growth that was prolonged both into the esophagus and trachea, and caused death by suffocation.

In 1868, Williams (Tr. Path. Soc. Lond., 1868–9, XX, 394–7) described the results of a necropsy, on a patient aged 67, who died with symptoms of dyspnea and dysphagia. On the posterior wall of trachea was found a warty excrescence about an inch in length, continuous with the thyroid gland, which was enlarged. The main thyroid was not examined microscopically, but the intratracheal growth, as a result of such examination, was pronounced malignant. The description given seems to indicate that it was a sarcoma, rather than carcinoma.

Langlet (Bull. soc. med. de Reims, 1876–7, XV, 98) in 1876 reported a case of cancerous growth protruding into the trachea, and Ballet (Bull. soc. anat. de Paris, 1878, LIII, 116–118) a similar case in 1878.

Heath (Med. Times & Gaz. Lond., 1879, II, 663) reported in the year following a spindle celled sarcoma involving the larynx and ending fatally, and in 1887 we have an interesting report of a case of intra-tracheal carcinoma continuous with the thyroid gland given by Semon and Shattock (Trans. Path. Soc. Lond. 1887–8, XXXIX, 42-47).

Guido Banti (Arch. di anat. norm. e patol. Firenze, 1889–90, V., 131–142) gives us in 1889 a lengthy description of necropsy upon a man of 62, with cancer of thyroid body involving the trachea and with secondary deposits

in the bronchi. Both external and internal growths had a histologic character, which was pronounced to be that of an aveolar carcinoma.

Wolfenden (Jour. of Laryng. Lond., 1890, II, p. 50) in 1890 reported a case of squamous epithelioma of thyroid invading the larynx. Tracheotomy was performed without relief to the dyspnea, due, as was discovered post mortem, to compression of the trachea by the enlarged thyroid below the tracheal opening.

In 1891 we have the report of another carcinoma of thyroid with involvement of the larynx, by Baginsky (Veröffentl. d. Hufeland. Gesellsch. in Berl., 1891–2 and 86–91).

Guion and Bufnoir (Bull. et mem. Soc. méd. de Hop. de Par., 1898, 3 s. XXV, 253) report in 1898 a carcinoma of thyroid with indolent vegetations in the trachea in a woman of but 32 years of age, who died rather suddenly of suffocation.

Finally Bosworth of New York wrote me in 1900 that he had had one such case occurring in a man of 40, in which he had to perform one of the most difficult tracheotomies he had ever done in his life.

To these cases let me add only that reported by Meyer (Archiv. f. laryngol. u rhinol. Berlin, 1896, XXVI, 389), which possessed certain clinical features of malignancy, but which histologically was almost completely of the type of a simple colloid goitre.

It occurred in a woman of 52 years, with large swelling on outside of neck, who died of suffocation due to the presence of a thyroid tumor filling up the trachea at about the 4th or 5th ring. The patient had been under observation nearly four years, and it was only during the last year that there was any marked increase in growth. Meyer was in doubt as to the true nature of the tumor, but called it, as a compromise, malignant adenoma; in favor of the malignancy were the destruction of the tracheal cartilage and metastases which were present in some of the regional lymph glands.

In fact the absence of decisive and definite lines of demarcation between malignant and benign tumors of the thyroid gland is a peculiarity in their pathology which has often been remarked.

While, on the one hand, we find Cohnheim (Arch. f. path. Anat., etc., Berlin, 1876, LXVIII, 547) talking about metastases from simple colloid goitres; on the other we find instances of cases of carcinoma of long standing and showing less than the usual signs of malignancy; as, for example, a case recently reported by Hobbes and Begouin (Rev. internat. de rhinol., otol., et laryng. Paris, 1898, IX, 261) of an epithelioma of the thyroid in a woman of 38, that had been present for sixteen years, and which was known at least for the last six years not to have increased at all in size.

Wölfler (Ueber die Entwickelung und den Bau des Kropfes, Berlin, 1883), who has written very extensively on this subject, and is generally referred to as an authority on the pathology of the thyroid gland, has strongly emphasized the difficulty of drawing hard and fast lines of distinction between the different classes of thyroid tumors.

He says in one place, for example (page 39), that so many transitional forms exist between adenoma and sarcoma, and more especially between adenoma and carcinoma, that we find we cannot state their boundaries, and have been obliged therefore to employ the term malignant adenoma to refer to certain tumors that do not come exactly under one head or the other.

Again, in another place (page 130), he says, we have to acknowledge that between papillary cystadenoma and papillary carcinoma, no essential distinction can be made; but rather a gradual difference manifested in the size and shape of the epethelium, in the distribution of the stroma and in the growth of the gland follicles.

Returning to the microscopic examination, of which we have given a full account above, we find several features which, taken together, speak so strongly in favor of the carcinomatous nature of the laryngeal part of the growth in my case, that I hardly see how we can fail to accept the diagnosis. They are (1) the irregularity of the cells varying, as stated, from cubical to columnar, (2) the fact that the cells were several layers in thickness, (3) the existence of an extensive papillary formation, the papillæ sometimes breaking through the alveolar walls, (4) the infiltration of the surrounding tissue and (5) the ab-

sence of a definite limiting connective tissue capsule.

Yet, as we have already above insisted and pointed out as an interesting feature of my case, the clinical aspects do not bear out the diagnosis of malignancy. In harmony with such diagnosis are only the facts (1) that we had to deal with a tumor, apparently for a long time quiescent, which finally began to grow, (2) the rapidity of the growth and (3) the prompt reformation after removal.

But on the other hand we have to oppose to the idea of malignancy, certain very forcible arguments, the chief of which is the continued absence of any signs of cachexia and the generally healthy and well nourished condition of the patient nearly three years after she was first under observation, the fact that pain was never a prominent symptom, and the general failure of any evidence of metastases.

In closing, I will only call attention to the apparent efficacy of galatin in this case in controlling the hemorrhage. The history of the patient, previous to coming under my care, was almost enough to suggest the appelation of hemophilia. She had had two very alarming hemorrhages in connection with certain abdominal operations, and during the first part of the time she was under my observation, was subject to most obstinate hemorrhages from the simplest manipulations in the larynx.

Under the local application of gelatin, I found that I might operate with impunity, and without daring to draw any inferences from this single experiences, I found further, that after the gelatin application had been used a number of times, the hemorrhage from operation became less and less, until finally it was no longer, as it had formerly been, a very considerable or serious feature of the case.

XXXVIII.

REPORT OF AN ACCIDENT WITH A TRACHEOTOMY TUBE.*

By Charles N. Cox., M. D.

BROOKLYN–NEW YORK.

L. T., female, age four years, multiple papillomata of the larynx. The child had been suffering from progressive difficulty of phonation and respiration for about two years. About four months before the writer saw her, she had been intubated for suddenly increased embarrassment of respiration, and had worn the tube for a number of days.

I did a low tracheotomy upon her, at the Bushwick Hospital, January 17th, 1899, a few days after she came under my care. At that time and for a long time previous, she was completely aphonic; respiration was very labored, her body was emaciated and her general condition bad. The larynx was literally filled with papillomata; so much so that they could be seen by direct inspection projecting above the epiglottis, upon depressing the tongue. About one week later the little patient was brought under chloroform anesthesia, through the tracheotomy tube, and laryngo-fissure performed. The larnyx seemed very small, even for a four year old child, and it was far from easy to recognize the topography of the interior of the larynx during the process of removing the growths. After their removal, the thyroid cartilages were united with sutures; likewise the skin down to the tracheotomy tube. Primary union was secured.

The child was never able to breathe entirely without the tube, and recurrence rapidly took place; although her general condition improved greatly, owing to the improved oxygenation obtained by means of the tube, which she tolerated well. Her mother became quite an expert in the care of the tube, so that it was not necessary to see the

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patient more than about once a month, to keep track of the condition of the tube, which was a solid silver one. Everything went along nicely for about two years. The child grew and was, generally speaking, quite healthy and active.

October 19th, 1900, I was hastily summoned to the house and informed that the tube had broken off and part of it was still in the windpipe. I found the little patient breathing easily through the tracheal wound. The mother informed me that upon attempting to remove the inner tube, part of the outer tube had come along with it; but that a part of each tube had been left behind; that respiration was somewhat embarrassed for a few minutes; then, following a fit of coughing, the remainder of the inner tube had been expelled; but that the inner end of the outer tube still remained.

The piece that was coughed out was about three-fourths of an inch in length. The piece of the outer tube that remained was, consequently about the same length, or little longer, since the break was in the same location in both tubes.

Upon consultation, both the family physician, who was already present, and I made out what we considered were unmistakable signs of a foreign body in the right lung at about what we thought might be one of the first divisions of the right bronchus. Chloroform anesthesia was now induced, and careful search was made for the missing piece of tube, with probe and forceps, through the tracheal wound. The effort was fruitless, save that I fancied I perceived metal contact once or twice. The child was then, at my suggestion, taken to the Bushwick Hospital. Dr. A. T. Bristow, of the consulting staff, kindly saw the case with me. He and one or two other gentlemen, independently and without suggestion, elicited the physical signs of a foreign body at the same location previously noted by the family physician and myself. At my request Dr. Bristow made a further attempt to reach the recreant piece of tube through the trachea. After repeated and somewhat prolonged efforts, the attempt was given up as futile. The condition of the patient and the circumstances of the case did not warrant an operation through the chest-wall.

The prognosis seemed most unfavorable, indeed. The

mother was informed of the hopelessness of the case, and was told that the little one would probably die in a few days of traumatic pneumonia. Not an unfavorable symptom followed—not even a rise of temperature. After two weeks of observation, a new tracheotomy tube in the meanwhile having been inserted, the patient was discharged.

About two weeks later, the child coughed up the missing piece of tube, and brought it out through the mouth. It was lain aside to be shown to me but unfortunately it was lost before the mother had an opportunity to bring it to the office.

For awhile preceding the accident, the mother had been somewhat remiss in the matter of bringing the child to me for inspection. I had not seen her for a couple of months or so. When last seen the tube was sound, bright and apparently in perfect condition.

She always has a tube in reserve now, and puts a new one in, herself, every three months.

XXXIX.

A PHYSIOLOGIC STATEMENT EXPLANATORY OF SOME OF THE SYMPTOMS OF MOUTH-BREATHING.*

By William Lincoln Ballenger, M. D.,

Chicago, Ill.

In 1896 while examining microscopic sections of the lungs of guinea pigs, which had been confined in an atmosphere laden with a mixture of starch powder and nitrate of silver, I was struck with the arrangement of the endothelial lining of the air vesicles. In the normal lung this lining is but one layer in thickness. In these specimens it was often two, seven, and in some places twelve layers in thickness.

This observation led me to the construction of an hypothesis explanatory of some of the symptoms of mouth-breathing. It occurred to me that perhaps in mouth-breathers there was a change, possibly a swelling or thickening, of the lining of the air vesicles, and that this would, in some measure, give rise to an interference with the interchange of gases through the walls of the air vesicles, thereby causing an auto-intoxication, which is expressed clinically in mouth-breathers.

The recent observations of Mendel, "Tracheal Injections, 1901," shows the tremendous absorptive capacity of the tracheal and bronchial mucosa for fluids and oxygenated water. He claims that there is no other mucous membrane better adapted for this purpose. The whole trachea and bronchial surfaces are lined with a single layer of columnar ciliated epithelium, beneath which there is a rich capillary net work of blood vessels. His experiments and clinical observations go to show that not only are oxygenated water and various other liquids tolerated, but that they are absorbed in large quantities when in-

*Read before the American Laryngological, Rhinological and Otological Association in Washington, D. C., June, 1902.

jected into the trachea. He cites the experiments of Colin wherein about two liters of water were injected into the trachea of a horse in the course of twenty-four hours without untoward result. This all points to the fact that not only are the air vesicles so constructed as to favor the physiologic absorption of gaseous media, but that the tracheal and bronchial lining absorb fluid and gaseous media in large quantities.

In brief, it has occurred to me that the loss of the nasal respiratory functions results in certain changes in the air vesicles and tracheal and bronchial lining, thereby interfering with the normal interchange of gases (oxygen and carbon dioxid) in the lower respiratory tract.

Whatever the changes in the lining of the air vesicles may be, it seems rational to hypothecate that it modifies the osmosis of gases and thereby gives rise to alterations in the metabolic processes, or nutritional activities which are finally expressed in the nervous and developmental symptoms so characteristic of mouth breathers.

We do not overlook other factors which undoubtedly contribute to the results embraced in this clinical picture. The presence of the pharyngeal tonsil is usually attended by suppurative nasopharyngitis. More or less of the septic material is absorbed into the circulation, and without doubt contributes to the clinical phenomena under discussion. Nor do we overlook the important anatomic connection which Axel, Key and Retzius have shown to exist, at least in the lower animals, between the naso-pharynx and cranial cavity. The lymphatic connection between the nasopharynx and cranial cavity, which they have demonstrated, may, in part, explain some of the nervous and mental signs of mouth-breathing. The absorption of the toxic material from the naso-pharynx may be carried to the brain and produce nervous and mental phenomena, as aprosexia, peevishness, etc., or the obstruction to the lymph channels may give rise to the same phenomena.

In addition to these and other causes, I wish to call attention to the role played by the lower respiratory tract, and more particularly by the air vesicles.

My views are epitomized in the following:

The term "mouth-breathing" implies the absence of

"nasal respiration." In other words, the respiratory functions of the nose are lost to the physical economy.

The respiratory functions are: (a) to warm or cool; (b) to moisten; (c) to filter the inspired air. McDonald has clearly demonstrated that air passing through the nasal chambers is either lowered or raised to almost the body temperature. The trachea and bronchi are supplied with but few glands and secrete but little moisture. The erectile and serous glands of the turbinated bodies throw out approximately sixteen ounces of serum in twenty-four hours. The warm and expanded air in the nasal chambers absorbs a greater portion of it, and it is thus carried to the lower air-tract, where it is needed for physiologic purposes.

When the temperature of the air is elevated its capacity to absorb moisture is greatly increased. This has an important bearing upon the question in consideration. The air is elevated in temperature in its passage through the upper respiratory tract, hence its absorptive capacity is increased. In mouth-breathers, failing to receive its full capacity of moisture from the nose, it abstracts it, therefore, from the air-tract below. Some have held that the moisture taken up in the nose is to be deposited in the bronchi and air-cells of the lungs, which are but sparsely supplied with mucous and serous glands. This is questionable if taken as a statement of the entire truth. Undoubtedly this is one of the purposes. Another purpose is to so charge the inspired air with moisture that when it reaches the lower air-tract it will not absorb the moisture which is there for physiologic purposes.

The nasal chambers are so constructed that the column of inspired air is thrown into whirls, and comes in contact with the moist Schneiderian membrane, where the dust, germs, etc., are deposited. The air is thereby partially filtered, and enters the lower air-tract comparatively free from obnoxious foreign particles.

As a consequence of the impairment, or loss of nasal respiration, the inspired air passes into the lower air-tract insufficiently tempered, moistened, and filtered. The mouth and pharynx but feebly perform the respiratory functions of the nose. The mucous membrane of the larynx, trachea and bronchi is therefore irritated. The epithelial cells lining the air vesicles (of which there is but a single layer) become irritated also.

I have not yet had the opportunity of demonstrating by postmortem examination the exact nature of the pathologic changes which take place in the lower air-tract of mouth-breathers, but I do not doubt that they occur, and that the capacity of the air vesicles to transmit oxygen to the blood and carbon dioxid from the blood is thereby impaired. That these changes are so pronounced, or are of the character of those observed by me in the lungs of guinea pigs is not claimed; it is only suggested that it seems probable that the loss of the respiratory function in the nose results in certain changes in the respiratory apparatus of the lungs, which impairs their capacity to carry on the interchange of gases. This may consist in the diminished osmotic property of the vesicle walls on account of the lessened amount of moisture, or it may be due to some tissue change in the vesicle walls themselves.

Thickened epithelial lining of air-vesicles. Because of these changes a deficient amount of oxygen is absorbed by the blood. Faulty oxygenation of the tissues or faulty metabolism results. The half-way products of oxygenation, as uric acid, etc., are freely formed and circulate through the system. Another effect is the retardation of the elimination of carbonic acid gas. In other words, carbon dioxid is accumulated in excess in the blood. When in excess it acts as a violent poison to the leucocytes, thereby impairing their function.

Function of the leucocytes impaired. We as yet know but little of the part played by the leucocytes, but we may, however, name the germicidal and scavengerial properties as among the fairly well established functions of these corpuscles.

Physical malformations and nervous phenomena. If we but recall the physiologic disturbances following irritation of the epithelial lining of the air vesicles, it becomes apparent that physical malformations and nervous symptoms must of necessity largely make up the clinical picture of mouth-breathing. Deficient oxygenation of the red blood corpuscles leads to imperfect metabolism. The nutritional processes are impaired, and there is a lack of co-ordination in the developmental processes. Physical imperfection, or malformation results. Excess of carbon dioxid leads to the impairment of the scavengerial

functions of the white blood corpuscles. The products of faulty metabolism, if allowed to accumulate in the blood and lymph fluid are toxic, or irritating to the nervous and other structures of the body. Their functions are disturbed, and manifested clinically in such signs as peevishness, inattention, aprosexia, restlessness in bed, enuresis, quick temper, etc.

The scavengerial function of the leucocytes being impaired, there is an accumulating of irritating subtances in the blood, which in turn cause peevishness, inattention, restless nights and quick temper. The impairment of the leucocytal function renders the patient an easy prey to microbic infection, and augments the nervous symptoms just enumerated.

Recapitulation. 1. The respiratory fuctions of the nose are to warm (or cool), moisten and filter the inspired air.

2. In mouth-breathers this function is absent or impaired.

3. The lower air-tract is incapable of supplying the requisite amount of moisture, hence the air vesicles and bronchi are abnormally dry.

4. This irritation cuuses certain pathologic changes in the air vesicles, which impairs their capacity to absorb oxygen and throw off carbon dioxid.

5. Deficient oxygenation of the blood results in the toxic products being thrown off into the circulation.

6. The "half-way" products are toxic and cause nervous phenomena and malnutrition.

7. The malnutrition leads to physical imperfection or malformation.

8. Excessive accumulation of carbon dioxid in the blood impairs the function of the leucocytes and other cellular structures.

9. The products of faulty metabolism (half-way products) are not removed from the circulation by the crippled leucocytes. The nervous phonomena are thereby still further increased by their presence.

The foregoing train of occurrences may be observed in children who are mouth-breathers, whether it be due to postnasal adenoids or to other forms of nasal obstruction.

100 State street.

XL.

THE SURGEON'S DUTY TO CHRONIC OTORRHEAL PATIENTS.*

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That chronic otitis media, especially when accompanied by purulent discharge, constantly imperils life, is well known by all aural surgeons. This risk to life by danger of the passage of infective material to the cranial cavity, in all cases of suppurative processes of the middle ear, so well understood by the surgeon, is, as a rule, looked upon lightly by the patient. It is not unusual to find those who consider their otorrhea one of Nature's mysterious, yet beneficent methods of ridding the system of some materies morbi which it is otherwise unable to cope with. The writer claims that the patient has an inherent right to know, as well as he may, the true condition of affairs and the dangers that lurk in his apparently harmless discharging ear.

By impressing the patient with the importance of the attention that his condition demands he will better care for himself. Not only so, but the surgeon's responsibility ceases, when the patient refuses radical procedure after being advised of the existing danger should the fatal termination supervene. As we all know, no set of rules can be laid down to guide us in every case when or when not to operate. A fatal result may supervene when quite unexpected. After exposure to cold, a blow on the head, or an attack of naso-pharyngeal catarrh dormant pathologic processes in the middle ear may suddenly become acute. The ominous symptoms of severe pain in head, rigors, fever, delirium, convulsions and coma indicate too plainly

*Read before the Western Section of the American Laryngological, Rhinological and Atological Society, April 3d, 1902.

the course the disease has taken and the catastrophe which is almost sure to follow.

Persons suffering from chronic suppuration of the middle ear may be a source of danger to others. Hovell* reports a case of a medical practitioner who had this affection and transmitted puerperal fever to several women whom he attended during their confinement and was compelled to give up his obstetrical practice on account of it. It is probable that the mastoid cells are more frequently affected in middle ear suppuration than is generally supposed. Bezold states that nine per cent. of all cases of acute middle ear suppuration are accompanied by mastoid suppuration to such an extent as to make spontaneous recovery improbable. Tubercular patients of this character are especially liable to the formation of cholesteatomatous masses in the tympanum.

Any impediment to the free escape of secretions from the middle ear favors mastoid involvement. Such impediments in the form of contracted meatus, polypi, granulations and membranous bands across the tympanum are by no means infrequent.

Retention of secretion is also likely to occur when the perforation is small and situated in the upper portion of the drum membrane. The anatomic arrangement of this part of the tympanum, known as the attic, accounts for the greater danger of extensions of disease when located there than if lower down. A fold of mucous membrane extends across the cavity from the short process of the malleus and almost completely divides the attic from the lower part of the tympanum. Reduplications of this membrane, or great swelling of the parts, may completely separate the two portions of the cavity. As the attic extends somewhat over the superior wall of the meatus, a very small space is left for the external discharge of inflammatory products which must pass either under the posterior-superior lip of the bony canal or through Shrapnell's membrane.

In cases of tuberculosis, influenza, scarlatina and syphilis, there is a special tendency toward the implication of the mastoid cells.

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*Diseases of the Ear, by T. Mark Hovell, 1901.

Recent investigations have shown that the spread of the process is mainly due to the action of micro-organisms (streptococci and diplococci). Microscopic examination should therefore be made of the secretions in all acute and chronic cases of tympanic suppuration. The presence or absence of pathogenic organisms in the discharge will greatly aid in prognosis of a given case.

A review of the anatomic conditions which facilitate the extension of pathogenic processes from the tympanum may not be amiss.

In a large per cent. of cases septic infection spreads by direct contact. A portion of the osseous wall of the tympanum being carious, perforation takes place, leading to or beyond the dura mater. These carious points are usually located in the roof of the tympanum, roof of mastoid antrum, and groove of the sigmoid sinus. An entirely different class of cases are those in which extension takes place in absence of caries or when the bony lesion does not extend through to the dura mater. These may be called anatomic, as infection takes place through anatomic or natural openings. The avenues of infection are 4 or more in number. (1) Gaps or dehiscences in the bone; (2) along prolongations of the dura mater; (3) through the labyrinth, after destruction of the tissue, covering the fenestrae; (4) through minute veins, in which thrombosis takes place, and extends from these to the nearest sinus (Hovell). Physiologic or natural openings from the tympanic cavity through which infective material could pass to vital parts may be found in the roof, floor, anterior wall, the posterior and inner wall of the cavity.

Infection from the roof of the tympanum may take place through the petro-squamous fissure, which often exists in children. Through this fissure, a process of the dura mater, containing many small vessels, passes down into the tympanum. This plate of bone, which forms the floor of the middle cerebral fossa, is very thin and often contains small openings. This bone is also very liable to be the seat of caries.

The floor of the tympanum. The floor of the tympanum forms the roof of the jugular fossa and sometimes contains dehiscences through which infective material may

pass to the vessel, with thrombosis or ulceration of that structure.

The anterior wall of the tympanum lies close to the internal carotid artery. Its walls are sometimes extremely thin and present several small openings. Besides these openings a few minute branches of this artery pass into the tympanum.

The posterior tympanic wall contains several openings leading to the mastoid antrum and cells, through which infective material may very easily pass. The structure of this part accounts for the occurrence of sinus thrombosis and abscess of the cerebellum which so frequently follows middle ear suppuration.

The eminentia pyramidalis, also in this region, contains an aperture through which infective material may pass into the Fallopian aqueduct and thence to the internal meatus. Through this opening passes the stapedius muscle and small nerve.

Inner wall. There are several pathways through which infective material may pass through the inner wall of the tympanum, more especially, however, after carious or operative destruction of their structual coverings. The passage may, after destruction of its membrane, be through the fenestra rotunda or through the fenestra ovalis after detachment of the stapes. In caries of the upper and posterior part of this wall the external semicircular canals may be exposed. Other routes are furnished by the aquaeductus cochleae and the aquaeductus vestibuli. Minute gaps also sometimes exist in the wall of the Fallopian aqueduct, which leads to the internal meatus, and larger openings may result from caries.

Statistics do not enable us to arrive at the exact per cent. of cases of chronic middle ear suppuration that suffer acute exacerbation with cranial involvement. The proportion, however, is much greater than is generally supposed. The prognosis after extension of the disease is always grave and operative procedures are more exacting than in primary acute cases.

The following cases from the writer's practice illustrate the insidious and dangerous nature of the disease under consideration.

Case I. Man, 35 years of age. Robust health. Had purulent discharge from ear from time to time for 20 years. He never suffered pain from ear and was only annoyed by the somewhat copious discharge from ear, being worse when he had a cold. There was a large perforation in the lower quadrant of the drum membrane which gave exit to the discharges. The discharge was odorless and had the appearance of mucus. Eustachian tube freely open. He was treated regularly for more than a year by every known method, save operative, to no avail more than to sometimes check the flow for a short time. During all of this period he suffered no pain nor could tenderness be elicited by firm pressure over any part of the temporal bone.

While visiting the country he was suddenly attacked by severe pain in his ear. I found upon the next day some tenderness upon pressure over the antrum and a slight rise of temperature. The pains increased and upon the third night the patient was partly delirious.

The Stacke-Schwartze operation revealed the antrum filled with pus and granulation tissue and mastoid cells entirely to the tip filled with pus. The cells and necrosed bone back of the lateral sinus were removed, also performed complete exenteration of the tympanum. Considerable carious bone was found in the roof of the tympanum.

There had evidently been no extension to the cranium as the patient made an uneventful recovery.

Case II. Man, 38 years of age. Facial paralysis of several years standing. Came to office for the relief of a severe pain in ear on side of paralysis. Found the meatus partly filled with offensive inspissated pus. Small opening through Shrapnell's membrane. The patient gave a very indefinite history of having had ear trouble several years before, but since that time had not thought it of enough importance to give the ear any attention.

Upon the third day from his inception of pain the radical operation was performed. Large cholesteatomatous masses with pus were found in the middle ear and antrum. Walls of the typanum were denuded of mucous membrane in several places, but no direct track could be detected by which the infective material had passed to the brain or elsewhere.

The operation performed was the Stacke-Schwartze. The patient continued to complain of severe pain radiating over the whole side of the head. Upon the third or fourth day (after operation) it was noticed that his facial paralysis had passed away. Pressure made by the cholesteatomatous mass upon the facial nerve at point of passage through the tympanum had doubtless caused the paralysis.

Symptoms of brain irritation soon developed but not sufficiently marked to locate the brain lesion. The continuance of pain and mental hebitude prompted a second operation on the sixth or seventh day. Purulent meningitis and cerebellar abscess were found. The patient soon passed into a state of coma and death.

This case was, in all probability, one of direct contact, infection taking place through the roof of the tympanum or antrum at the onset of his illness.

Case III. May 24. History of tuberculosis several years ago but had apparently entirely recovered and presented a healthy, robust appearance. Had chronic disease of the ear for several years. Very slight discharge at any time and none at all for periods of several months. Complained of a feeling of pressure and uneasiness in affected ear. Objectively, canal small. Drum membrane reddened and a small perforation in the upper posterior part. No tenderness upon deep pressure over the antrum or cells. The patient being intelligent, his condition was fully explained to him and operative procedures advised, either through the meatus or mastoid. He readily consented to an operation and favored the radical one.

Three or four days before the time set for the operation he came to me suffering great pain in ear and temporal region with slight elevation of temperature, which came on suddenly the night before, without any apparent cause more than a slight cold.

The radical operation revealed the middle ear and antrum filled with granulation tissue and pus. Mastoid sclerosed. Every portion of diseased tissue that could be found was traced out and removed. The patient's temperature dropped to nearly normal in a few hours after the operation, but excruciating pain continued over the whole of the temporal region extending into the eye of the

affected side. The pain continued in severity with a temperature not above 101 1/2 to the sixth day after the operation, when the patient became drowsy and in a state of hebetude. Ocular examination proved negative as a means to diagnose the existence of brain lesion, as did also a most searching examination of the reflexes by Dr. H. G. Brainard.

At the beginning of the comatose state of the patient, the dura mater was laid bare over the middle fossa and a sterilized needle introduced in all directions in search of an abscess, though none was found. Autopsy showed great hyperemia of the meninges over nearly the entire left hemisphere of the brain, and a softened area the size of a silver dollar near the cortex in the temporal region.

There were no adhesions of the dura to the bone or localized inflammatory spots at any point to indicate the place through which infection passed

This case is one in which infection took place in all probability through some of the natural channels.

Indications point very strongly to the belief that both of these lives could have been saved had operative procedures been resorted to before the onset of the acute exacerbation of the smouldering disease.

Just when the time arrives for the surgeon to step in and lift this Damoclean sword, ever suspended over these patients no ancient or modern disciple of Esculapius has been able to determine.

XLI.

THE TREATMENT OF LARYNGEAL PAPILLOMATA WITH REPORT OF A CASE.

By Dunbar Roy, A. B., M. D.,

ATLANTA.

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The etiology and treatment of laryngeal neoplasms is still a very mooted question among laryngologists. Clinical observations have afforded so many diverse opinions in regard to these growths, that each one must as yet be a law unto itself. Anomalous conditions, both in appearence and disappearance, are liable to be seen in every case coming under the care of the laryngologist.

Malignant neoplasms of the larynx are fortunately much less frequent than those of a benign character. Of these latter, laryngeal polypi or papillomata are by far the most frequent, constituting according to statistics more than half of all benign laryngeal growths.

Our ideas in regard to both etiology and treatment of laryngeal papillomata have not materially changed since the appearance of the well known works of Czermak, Turk, Von Bruns, Mackenzie and Mandl.

While the etiology of these growths is still disputed, most observers recognize the prominent part played by a chronic congestion and a so-called catarrhal state of this organ. Bosworth believes that many of these growths arise from a perfectly healthy membrane without a previous catarrhal condition.

Chronic congestion of the larynx, as produced from excessive use of the voice, or from that of tobacco and alco-

hol, especially the latter, have in my experience been important factors in producing these neoplasms. However there are many other causes, since the growths are limited to no age of the individual and in fact some have been reported as congenital in character.

Here again there is a difference of opinion among observers as to the age at which these growths most frequently occur.

Tobold in his work, says that papillomata are most common in middle life, from the thirtieth to the sixtieth year. Dr. Casuit in article on the same subject, declares that they most frequently occur in early infancy. Mackenzie says that his experience leads him to consider the middle period of life as the most favorable to the development of these growths, a view also held by Lennox Browne. Shurly does not consider one age more liable than another.

Papillomata occurring in adult life and those occurring in childhood and infancy certainly differ as to the etiology of their production. In some cases it is evident that the laryngeal membrane has some inherent tendency to proliferate and form these growths, but the reason for this cannot be clearly demonstrated. My own opinion coincides in a great degree with those of Gerow and Fauvel who believe that "a papilloma is not a tumor but a proliferation of the mucous membrane." Here is a public speaker who drinks freely and smokes inordinately. His whole respiratory membrane is kept in a constant state of congestion. Soon he begins to suffer with hoarseness and on examination we find a small papilloma close to the edge of the vocal cords. To our clinical mind, the etiology of this neoplasm is evident. Here is a small patient, eight years old, who suddenly becomes hoarse without any previous noticeable laryngeal trouble. On examination we find one or two excrescences of a papillomatous character just at the free edge of the vocal band.

The two growths are considered histologically the same and yet the cause of each must be different.

A good many observers, among them Lennox Browne, would seem to think that these neoplasms bear some relation to adenoids in the naso-pharynx, because in some instances the two growths are found simultaneously.

Here again individual observation plays a prominent part, since many excellent clinicians have never noted such a relationship. This latter has been my own experience and I notice it is the view held by Dr. Shurly in his late text-book.

The question of a tubercular or syphilitic diathesis opens up in my mind a broad field for investigation, notwithstanding that so eminent an authority as Morell Mackenzie says "neither syphilis nor phthisis nor any other constitutional condition appears to favor these growths." I have seen a few cases of syphilitic excrescences on the vocal cords in negroes disappear entirely under the use of the iodids. Is it not possible for such excrescences to take on the character of true papilloma? I see no reason why, if we may accept the fact of an occasional transformation of a benign into a malignant neoplasm, and also the fact of recurrences at the point of removal, as have been frequently reported, we may not also accept the possibility of a cell proliferation as a result of a systemic dyscrasia.

In fact the old writers upon tumors, attributed the etiology of such to some blood dyscrasia which they supposed caused a cell proliferation in some portions of the body. Even to-day the pathology of tumor formation is a matter of dispute.

Virchow believes that there is always an external irritant while Cohnheim considers the non-development of some of the germinal layers the chief factors in tumor formation.

There remains much yet to be done if we may know with certainty the pathology of tumors in various parts of the body and papillomata of the larynx in particular.

For many years after the introduction of laryngoscopy, the mode of treatment by the endolaryngeal extirpation was pretty universally accepted, but in the last few years laryngologists have become divided in their views as to the best management of these laryngeal neoplasms.

The various cutting and pinching forceps, snares and knives which have so aided the laryngologist in the quick and safe removal of these growths, have certainly added to the popularity of this mode of treatment. But clinical observers have begun to note, after the surgical removal of these growths, in many cases, especially in the young,

that there is frequently a tendency for these growths to return with startling activity. While denied by many, the few authentic cases reported, certainly warrant us in considering the possibility of the transformation of a benign into a malignant neoplasm. The more extended becomes my clinical experience, the more I am convinced of the fact that laryngo-rhinologists of to-day are too prone to active surgical intervention in cases which should have received more consideration at the hands of conservatism.

In the treatment of laryngeal papillomata, my experience leads me to conclude that the method pursued must in a great measure vary according to the age of the patient.

We may divide the present methods of treatment into: (1), Chemical; (2), Endolaryngeal by surgical means; (3), By external operation, such as tracheotomy, thyrotomy, etc.

1. I believe it is to Dr. Delavan more than to any one else that the method of treating these growths by spraying the larynx with alcohol has been brought prominently before the profession.

Personally I have been very much impressed with this method and have used it with satisfaction in several cases.

When we remember that there are many patients who will not submit to having a small growth removed by any instrument in their larynx, and that there are others whose larynx is so irritable as to preclude all possibility of surgical intervention, it is indeed a source of satisfaction to be able to use a gentler method and at the same time frequently just as efficacious. Especially is this true when we have a case of laryngeal papilloma in a very young subject.

To attempt the endo-laryngeal removal of a papilloma by surgical means in the very young, is an exceedingly difficult proposition in the first place and in the second the results have been anything but encouraging.

In fact I believe that such a radical procedure in children is not warranted except as a last resort and even then it is questionable. It is a recognized fact that these growths have a progressive and regressive stage, especially noticeable in children.

A recent case under my own observation is of interest at this point, showing as it does the value of unintentional conservative treatment. Mary M., colored, aged 9, was brought by her mother to my clinic in May, 1901, on account of a hoarseness and difficulty in breathing at night. A strong, well nourished child was seen with no signs or history of any blood dyscrasia. The nose, nasopharynx and pharynx appeared normal. By laryngoscopic examination, a papillomatous growth was seen on phonation to spring from just beneath the free edge of the left vocal cord, anteriorly. It had the typical appearance of a papilloma, freely movable and about the size of a small raspberry. I commenced immediately to educate the larynx with instrumental manipulations, preparatory for its removal with forceps or snare. This was continued for two or three weeks, the larynx being mopped out each time with cocain solution. Just as soon as the forceps were introduced, spasm of the larynx took place and nothing was accomplished. Finally the obstruction to breathing becoming so bad at night, I made preparations for putting the patient in the hospital and doing a thyrotomy.

Just at this time I was compelled to leave the city and the day after my return being compelled myself to be operated upon for appendicitis, I did not again visit my clinic until the following September.

On asking my assistants what had become of the case, they informed me they had not seen her for a month. That during my absence her symptoms had grown better and they had continued to make applications of cocain without any further treatment. Meeting the patient on the street in October, I asked how she was getting along. Much to my surprise she replied in a clear voice that she was all right. Later I made a laryngoscopic examination with the result that not a vestige of the growth remained to be seen.

Here is a case similar to those reported as of spontaneous disappearance, for it is hard to conceive of any curative effect of cocain applications. Possibly the astringent effect of the cocain may have had some value.

Laryngeal papillomata in children show many changes which are not seen in those occurring in adults and for this reason the treatment must vary. In adults, the re-

moval of these growths by endolaryngeal surgical methods, is usually attended with permanent success, while in children, experience has shown that a recurrence is more than likely to follow.

I am firmly convinced that the so-called palliative treatment in children, and even with adults except in unusual cases, would be very much more successful in final results than the more radical measures. Dr. Massei of Naples, in an article published in 1893, has called attention to the fact that a regressive stage usually follows a progressive one after a certain time and this fact should merit attention both as to our knowledge of the nature of these growths and also their treatment.

I believe that cases of laryngeal paillomata in patients of all ages should be kept under observation for some time and topical medication applied before adopting any endo- or extra-laryngeal surgical procedure. The views expressed by Lennox Browne agree with my own clinical experience.

He says "The number of people, to whom the advice to watch and wait is given, must be very small; but without doubt, there are a very large proportion of cases which never require treatment, and if left to themselves never assume a serious aspect. There is no reason to doubt that while many of these formations remain stagnant, a large proportion would, on no less authority than Virchow, if untreated frequently disappear spontaneously, being subject as they are to slow atrophy and absorption."

The endolaryngeal removal of these growths in children, has been almost universally unsuccessful in the final result. If we will examine the literature on this one point, we will see the truth of the assertion. In a number of cases reported, it has been seen that not only was there a rapid return of the growth, but they increased frequently in size and in a short time the patient was in a very much worse condition than before the operation.

It may look brilliant to remove a growth per vias naturales in a child, but the result certainly does not justify the means, even if we leave out of consideration the by no means remote possibility of injuring other portions of the larynx.

What is true in regard to the unsatisfactory results in

the removal of these growths by the endolaryngeal method is even truer of the method of removal by thyrotomy and tracheo-thyrotomy. Very naturally this latter operation is much more serious and is not attempted except as a last resort.

Mackenzie has well expressed a conservative view when he says: "Laryngotomy is only justifiable when an experienced laryngoscopist has declared the removal of the growth per vias naturales impossible."

If then we have an equal chance of curing laryngeal papillomata by conservative measures, such as the topical application of alcohol or formalin as compared to surgical intervention, should not the former be preferred to the latter?

Since our attention has been called to the use of alcohol in these cases, numerous observers have reported marked success.

At a meeting of this society in 1898, Dr. Halsted reported two cases of papilloma of the larynx which had recurred after operation and which were finally cured by the use of an alcohol spray.

In 1899, at a meeting of the N. Y. Academy of Medicine, Dr. Chappell reported a papilloma in a child cured by the topical application of alcohol. In this case tracheotomy had been performed and the question of cure must be divided between the two. Several of the speakers at this meeting reported excellent results with the use of alcohol. A case of my own is of interest as bearing on this point.

Rev. J. B. R. consulted me in the Fall, 1900, on account of a hoarseness which had been present at intervals for two years.

He had been compelled to give up his pastorate on the advice of another laryngologist on the possibility of an incipient tubercular laryngitis.

On examination, I found a pinkish excresence on the anterior portion of the left vocal cord, typical in appearance of a papilloma.

I advised its surgical removal. To this he would not give his consent and as an alternative I suggested the daily application of alcohol by his physician in the town where he lived, not having much faith in the final result. Six months later he informed me that his voice was per-

fectly clear and natural and that he had again returned to the pulpit.

Formalin has also been used with success in eradicating these neoplasms in the larynx.

The following case is of interest, reported by Dr. A. Bronner in the British Medical Journal, 1901.

Mr. P., age 45, seen first in June, 1896. Both vocal cords and parts of ventricular bands covered with typical papillomata. These were removed with forceps. In three months the growths were more abundant than before. They were again removed and lactic acid applied. In July they were as bad as ever. Finally a spray of formalin, beginning with 1 to 1000 and then 1 to 100 was used with the result of a complete cure.

The only other method of treatment which seems to me to commend itself in cases of children, is the method of prolonged tracheotomy.

In 1893, Dr. White of Richmond, reported a case of a boy 5 years old, in which papillomatous growths recurred quickly and luxuriantly after each operation. Tracheotomy finally became necessary. In 3 months the growths were greatly diminished and in three years had completely disappeared.

A number of other cases have been reported where the neoplasms disappeared entirely after prolonged tracheotomy, and while this operation is not devoid of danger, it must certainly be recognized as the safest of the extra-laryngeal methods, especially when in the large majority of cases, recommended by Morell Mackenzie to be done in all cases, it is a preliminary operation to laryngotomy.

Such a procedure is certainly to be recommended when so excellent an authority as Sir Felix Semon has said that while brilliant results were sometimes obtained, recurrences usually took place after a thyrotomy and he knew a case where no less than 17 thyrotomies had been necessary on account of repeated recurrences.

In conclusion, I am free to admit, that according to my own clinical experience and a study of the literature of the subject, the best results in the management of these cases will be obtained as follows:

1. In adults and children suffering with laryngeal papillomata, the case should be kept under close observation

and prolonged treatment with topical remedies, such as alcohol and formalin, chlorid of zinc, etc., should be tried before resorting to surgical intervention.

2. In adults, should the mild treatment prove unsuccessful and especially should there be any interference with breathing, the endo-laryngeal removal with instruments may be resorted to.

3. In children the interval of mild expectant treatment should be even longer than in adults, and should the symptoms warrant surgical intervention, then prolonged tracheotomy is the safest and surest procedure.

4. Laryngotomy should be done only when all the other methods have failed.

Grand Opera House.

XLII.

EPITHELIOMA OF MIDDLE EAR.*

By W. H. Haskin, M. D.,

NEW YORK.

E. W., aet. 42, widow, with negative family history, complained of intense pains in left ear which radiated over the side of the head, forehead and occiput and down into the neck; also of very offensive otorrhea and of something protruding from the ear.

She had had running ear at intervals for the past thirty years, but never received treatment for there was rarely any pain. The original attack of O. M. S. C. came from scarlet fever. For two years past has had occasional attacks of weakness and vertigo, and believes she has lost considerable weight. The pain has been so severe for the past four months that she has been unable to sleep or rest well night or day. It was proceded by an attack of grip.

Hearing tests. Watch and acoumeter negative.

	C	C^2	C^4
Galton, 2.3.	Rinne B. C.	B. C.	A. C.

Remarks made by Dr. Clemens in assigning case to me were: "That the left canal was filled by a large mucous polyp presenting in external meatus and completely filling the canal."

April 23, 1901. Removed with snare a large polypus, 3/4 of an inch long, apparently coming down from the attic. This was done under nitrous oxide anesthetization; profuse bleading ensued, and the canal was packed with idoform gauze.

May 8, 1901. Pain not relieved by operation and growth had completely filled the canal again; was very vascular, bleeding on slightest touch, so that malignancy was suspected. Pathologic examination of growth removed April 23, 1901, revealed only simple myxoma with cystic degeneration.

* Read before American Rhinological, Laryngological and Otological Society, June 4, 1902.

May 31, 1901. The pain having continued as intense as before, she consented to a radical operation being performed and a complete enucleation of mastoid was done.

The incision was carried well up over the canal and the whole mastoid was exposed, the ear being separated and pulled forward on to the cheek. The outer plate was found to be very thick (1/4 of an inch) and of ivory denseness throughout. On removal of this plate a dark vascular mass was found occupying the antrum, attic and tympanum, all of which cavities had been much enlarged by pressure, the inner walls being carious. The bony posterior and superior walls of canal were almost destroyed by caries, there being but a small bridge of canal remaining.

The tegmen tympani, antri and attic were carious, and in removing these walls the dura mater was exposed both in middle and posterior fossae.

The bony wall of lateral sinus was also carious and was removed for at least an inch. The sinus was apparently not thrombosed and was not opened. As there was pus found in the tip, all the outer plate and cellular structure of the mastoid was removed. The disease extended above the canal well into the squamous portion, so that the bone removed was very extensive. The exposed bony surfaces were then swabbed with pure carbolic and absolute alcohol. After trimming off all the diseased portions of the soft tissues in the canal there was not enough left to form any flaps. The wound was then packed both posteriorly and by the canal.

June 2, 1901. Owing to the severe pain and headache for several hours, with a rising temperature, the first dressing was done. There was considerable staining of dressing, and the inner packing was very offensive. There were no granulations, but the whole wound was covered by a nasty grayish slough.

Hot bichlorid (1 to 5000) solution was ordered for irrigation and the wound was ordered to be dressed twice a day.

June 10, 1901. All odor disappeared, and the wound had granulated over but granulations were very pale and soft, and there was exposed bone in the antrum. The condition apparently continued to improve, though very slowly; the secretions were very profuse aad the granulations remained large, soft, pale and edematous, until

the latter part of June, when she was discharged from the hospital and sent to the out door clinic.

The examination of the tumor removed on May 23, 1901, by Dr. E. L. Oatman, was pronounced to be an epithelial tumor, but not an epithelioma, although the whole course of the disease from time of operation indicated malignancy.

July 24, 1901. Patient was readmitted to the hospital with a swelling below the wound. The latter had not closed in at all with bone, but was filled with unhealthy granulations which simply poured out pus in all directions, very offensive in character. Ichthyol, enzymol, carbolic acid, nitrate of silver, and cupric sulphate were used to stimulate the granulations and two sinuses were scraped and packed.

August 9, 1901. Patient's condition had grown steadily worse, and a large swelling in the neck below the mastoid appeared. Ether was given and the whole wound was scraped out. A sinus was found leading downward through inner plate of mastoid and burrowing through sterno-cleido muscle and behind it. All the inner plates were removed exposing sigmoid sinus and jugular bulb. Another sinus leading backward toward occiput was thoroughly opened, and after careful irrigation the wound was packed with iodoform gauze. Examination of the granulations removed at this time were for the first time pronounced to be epithelioma without doubt. From this time on the conditions have steadily grown worse. She was discharged from the hospital about the middle of September and disappeared, having gone to Yonkers.

April 15, 1902. I saw her at Yonkers. The wound had increased in size; there was a large mass behind the car reaching almost to the occiput and another involving the neck almost to the clavicle.

Dr. Foy, of Yonkers, who has taken care of her for six months, told me that he had cut away on three occasions large masses of growth which sprang out all around the wound, hiding the ear from behind, and which bled on slightest touch. On this day the granulations were very extensive, reaching well forward above the ear, though the auricle has remained uninvolved. The patient has suffered with most intense agony constantly, and has only been relieved by increasing doses of morphin.

Remembering the extensive exposure of both the cerebral fossae and of the sinus, one cannot understand why septicemia or meningitis has not intervened and relieved this poor woman of her wretchedness.

XLIII.

HYDROBROMIC ETHER; NOTES UPON ITS USE AS AN ANESTHETIC IN ADENOIDS AND TONSIL OPERATIONS.*

By D. J. Gibb Wishart, M. D.,

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PROFESSOR OF LARYNGOLOGY AND RHINOLOGY, TRINITY MEDICAL COLLEGE, AND THE ONTARIO MEDICAL COLLEGE FOR WOMEN, TORONTO.

Hydrobromic ether or ethyl bromid is a liquid prepared by distilling a mixture of alcohol, bromin and phosphorus. It is colorless, extremely volatile with a strong peculiar odor, and a warm sweetish taste. The specific gravity is 1.419. It boils at 106° F. On keeping, it is liable to liberate free bromin.

The use of this drug as an anesthetic is not new in America, but so far as I am aware, it is new in Ontario, and, therefore, the following notes, prepared as a result of the administration of the drug to a series of patients (21) in the Hospital for Sick Children, since January last, may not be without interest. The drug used was that prepared by Merck, put up in one ounce glass stoppered bottles, and while the greatest care was exercised to prevent evaporation, it was seldom possible to obtain more than four anesthesias per ounce. Application was made with a closed inhaler, consisting of a metallic framework, the shape of a cylinder, with cross-sectioned fenestræ in the frame, through which a cotton bandage is woven backward and forward to expose as much inhaling surface as possible, one end being left open and the other encased in a rubber covering. Into this a fluid drachm of the ether was placed, and the mask was quickly glued over the mouth and nose of the patient, every particle of air being rigidly excluded as far as possible, until complete anesthesia was pro-

*Read before the Ontario Medical Association, June 5th, 1902.

duced. The administrator watched the cornea of the patient, while another attendant kept track of the pulse with a watch, announcing aloud each quarter of a minute. The patient was seated in the upright position in an ordinary chair, the legs and arms being controlled by a nurse, or by a bandage. The mouth gag was inserted and opened, and every preparation was made for rapid operation before anesthesia was commenced. During the pre-anesthetic stage in the majority of instances there was struggling, as a rule easily controlled, and lasting only several seconds. On an average anethesia was complete in 62 seconds, or exclusive of three special cases 49 seconds, and lasted about 53 seconds. In one or two instances the anesthesia seemed very incomplete, and yet the patient would not acknowledge having been aware of anything taking place, or of the sensation of pain. In the majority of cases, the anesthesia was quite satisfactory. The normal color of the patient was maintained in every instance, and no blueness nor embarrassment of the respiration was perceived in any case. Several of the patients were allowed to walk out of the operating room, which they did without difficulty or assistance. The majority of the patients, however, were made to lie upon the stretcher, face downward, a position I always chose in these operations to prevent the swallowing of blood. The pulse was slowed in the majority of instances, and in a number became stronger, these results being the opposite to those found by H. C. Wood. The only after results were a headache in two cases and drowsiness in five others. Vomiting and nausea were entirely absent.

The period of anesthesia with ethyl bromid is so short in duration, at most about fifty seconds, that the operator requires to be ready and speedy, and the operation must proceed without a hitch. When adenoids only are to be removed, this can be done with the curette or forceps, and afterward the finger used to examine the vault, and all fragments taken away, easily within the time limit. If, however, the growths exist chiefly in the neighborhood of the Eustachian tubes, it may prove difficult to remove them thoroughly within the time allowed. Again, when the enlarged tonsils are free of the pillars, or if attached are only single, but slight difficulty will be experienced.

When all the tonsillar ring is enlarged, or when any peculiar features are presented, such as a submerged tonsil, the term of anesthesia is too short, and removal if attempted will prove unsatisfactory. It is better in such instances to divide the operation between two or more sittings, or to use one or the other forms of anesthesia.

The sitting posture of the patient allows of the head being held forward by the administrator, during the operation, so that all blood drips out of the mouth and nose, and the tendency to inspiration of blood and laryngeal embarrassment, so annoying in anesthesias which require the prone position, is obviated and avoided.

Some years ago the writer used nitrous oxid alone, or combined with oxygen in these operations, but abandoned them shortly, chiefly on account of the cumbersome nature of the apparatus required. The use of nitrous-oxid alone is objectionable to the writer for two reasons: first, the position of the patient which must be as near prone as possible; and secondly, the terrifying nature of the color, and the embarrassment of respiration produced. The difficulty with regard to the color is obviated by the combination with oxygen, but the apparatus is rendered more cumbersome. Ethyl bromid is superior to these, therefore, because the normal color is retained, respiration is not interfered with, and the apparatus can be carried in one's pocket.

The struggling so frequent in this series may be due to the fact that the patients were all children, the average age being 7 2/3 years. In no case was it so extreme as to interfere with the operation.

It is hardly fair to put these cases on record without making reference to the experience of other operators, and especially to that of the writers upon anesthesia. C. P. Hewitt, in his last edition,[1] devotes considerable attention to bromid of ethyl, chiefly depending for his statements upon the observations of Dr. J. F. Silk, in 130 cases where this anesthetic was used in dental practice. The effect produced is described as analgesic rather than anesthetic, and when inhalation exceeded two minutes, the after effects were liable to be troublesome. The average time required to produce anesthesia was sixty-six seconds, and the average duration forty-six. The adminis-

tration of the anesthetic was continued until snoring, breathing, or insensibility of the cornea was produced. Several deaths that had occurred during, or immediately after administration, were investigated by Dr. Silk, who says that in some of these[1] sudden and early heart failure occurred; in others[2] respiratory paralysis took place somewhat later in the administration; and in others again[3] gastro-intestinal symptoms were recorded. Hewitt does not look upon bromid of ethyl with favor, regarding it as less safe than nitrous oxid, but advises further experiment where brief anesthesia is required.

H. C. Wood, of Philadelphia,[2] regards bromid of ethyl as a cardiac depressant, the action upon the heart being similar to that of chloroform, and states that the pulse usually becomes increased in rate, and somewhat diminished in force.

Gleitsmann of New York[3] who has used the drug since 1894, prefers it for short operations, and only records one case of suspended respiration.

In the clinic of Lermoyez in Paris, as reported by Sondern,[4] the amount used for a child is 5 to 10 grams. Anesthesia is arrested when the pupils dilate, and the conjunctiva begins to slowly suffuse, after which, if the anesthestic be continued, the muscles are found to contract. Anesthesia lasted about two minutes.

Malherbe[5] operates with the head hanging over the table, and gives the patient a few whiffs before putting on the full amount of the anesthestic. He has used the drug in 3,024 operations, and has obtained a fifteen to twenty-five minutes anesthesia. Here, of course, the administrations have not been confined to the narrow field contemplated in this article.

Kempter[6] uses a crash towel in a cone shape, and a dose of from 1 to 2 and a half drams. He states the mortality rate, reported at the Surgical Congress in Berlin, from 1890 to 1897 was 1 in 5,238 cases.

I am indebted to Dr. W. Lowry of the Hospital for Sick Children for the following detailed report of the cases and for much assistance in making the experiment.

Init.	Act.	Sex.	Disease.	Amt.	Time. Seconds.	Pre-Anesthetic Stage. Phenom.	Time. Seconds.	Anesthetic Stage. Phenom.	Post-Anesthetic. Stage After Result.
W. L.	4	M.	Tonsils.	d.¾	60	Struggling pulse rapid and strong.	20	Struggling weaker and rapid pulse. Anesthesia very short, not sufficient used.	
E. T.	4	F.	Adenoids.	d.1	60	Pulse strong strong and rapid.	60	Pulse full and strong. Anesthesia good.	
G. M.	4	M.	Tonsils Adenoids.	d.1	60	Rapid and full pulse for 20 sec., then became weaker.	60	Not profound, pt. struggled at end of 30 sec., op took 40 sec., pulse quite weak.	Pt. quite bright immediately afterward
F. L.	8	F.	Tonsils Adenoids.	d. 1	60	Pulse rapid and strong, some struggling.	60	Pt. very weak during anesthesia, struggled at the end of 55 sec., conscious at the end of 2 min. from start.	No ill effects.
W. H.	6	M.	Adenoids.	d. 1	60	Struggling, face flushed, veins of neck prominent, pulse rapid and strong.	45	Pulse slower and weaker, difficult to feel.	No excitement.
R. G.	10	F,	Tonsils Adenoids.	d. 1	45	Struggling, flushing of face, pulse full, rapid and strong.	60	Pulse slower, weak but full.	No excitement, pulse good pt. could have walked in 5 min. No after res.
M. K.	9	F.	Adenoids Tonsils.	d. 1	45	Struggling, flushing of face, pulse full, rapid.	30	Pulse slower, but strong.	No excitement. No after result.
M. C.	9	F.	Tonsils Adenoids.	d. 1	45	Rapid and full, then rapid and weaker, some struggling at first.	12	Slow and weak, color good, anesthesia fair.	Quite a lot of excitement.
N. B.	13	F.	Tonsils Adenoids.	d. 1	60	Rapid and strong pulse, some struggling at first.	60	Slow and weak pulse, anesthesia good.	No excitement, pt. was dazed and drowsy for some time

A. G.	4	M.	Tonsils Adenoids.	d. ss then d. i	3 min.	A lot of struggling, rapid full pulse, no anesthesia until extra d. i was given.	60	Slow and weak pulse, good anesthesia.	Dazed and drowsy for some time.
E. N.	11	M.	Adenoids.	d. i	50	Rapid and full pulse, no struggling.	70	Slow and strong pulse, good anesthesia.	
G.	7	F.	Adenoids.	d. i	50	Struggling at first, pulse rapid and full.	40	Slower and hard to feel on account of struggling.	Pt. excited, restless and dazed.
T.	4	F.	Adenoids.	d. i	45	Struggling at first, face flushed then pt. became very quiet.	40	Pt. very quiet and lax, more so than any case yet, very satisfactory anesthesia.	Pt restless and tossed about for a time.
B.	11	M.	Adenoids.	d. i	50	Pulse full and rapid. Pt. struggled quite a lot, face flushed and eyeballs prominent.	30	Pulse quite slow, regular and full.	Pt. quite conscious, in a couple of minutes walked into another room, in 2 min. was restless, tossed about twitched his hand and muscles for some time.
N. B.	13	F.	Tonsils.	d. i	30	Pulse rapid and strong, quite a lot of struggling.	60	Pulse slower and weak, fair anesthesia.	
T. W.	3	M.	Adenoids.	d. i	30	Rapid and full, no struggling.	30	Rapid and strong, anesthesia very short. Struggled toward the end.	
C. E.	10	M.	Tonsils Adenoids.	d. i	35	Rapid and full, quite a lot of struggling.	50	Pulse full and strong, slow. Anesthesia short but good for tonsils.	
"	"	"		d. ss	30	Rapid and strong, extra d. ss given for adenoids.	45	Good anesthesia, pulse rather weaker.	Depressed and dazed for a short time.

T. B.	10	M.	Ankylosis elbow.	d. i	120	Pulse rapid and strong, quite a lot of struggling.	60	Pulse quite strong, but slower. Anesthesia quite satisfactory. Muscles quite relaxed and no pain felt.	Some drowsiness afterward.
T. B. (2nd time next day.)	10	M.	Ankylosis elbow.	d. i	135	Struggling and noisy excitement, pulse full and strong, rapid.	60	Slow and weaker, very satisfactory, struggled a little but did not feel pain.	

BIBLIOGRAPHY.

[1]Anesthetics and Their Administration, 1901. Second Edition.
[2]Therapeutics, Its Principles and Practice.
[3]Medical Record. December 2, 1901.
[4]Year Book of the Nose and Throat. 1901.
[5]Year Book of the Nose and Throat.
[6]Year Book of the Throat and Nose. 1900.

XLIV.

THE PROTECTION AND PRESERVATION OF THE LABYRINTHINE WALL WITH REFERENCE TO THE PROGNOSIS FOR HEARING IN RADICAL TYMPANO-MASTOID EXENTERATION.

By Redmond Payne, M. D.,

SAN FRANCISCO.

In all the descriptions of the Stacke and Schwartze-Stacke operations, directions are given that when the diseased cavities are reached they are to be thoroughly exenterated and their walls thoroughly curetted, the idea conveyed being that it is an ordinary abscessed cavity, which is cut down upon with the idea of cleaning it out, throwing all these cavities into one which is subsequently lined with skin flaps. There seems to be little thought in these directions for the future function of hearing and the labyrinthine wall with the stapes or its foot plate is considered simply as a part of the general abscessed cavity, and the inference left that it is to be handled in the same way, namely, by general and thorough curettement.

Now, if we but recall the anatomic conformation of the tympanic cavity proper with its most important structure, the stapes and labyrinthine wall, in relation to the adjoining cavities, the attic and mastoid antrum, we see that it is entirely unnecessary to touch the tympanic cavity proper with the curette, because the cavities to be exenterated, namely, the antrum and the attic, are very much above its level, and are the only portions from which free drainage is not secured from the external meatus.

The object of these operations is to thoroughly remove their contents and obliterate the diseased cavities which have been a menace to life. This can all be done and all the cavities thrown into one without encroaching radically upon the labyrinthine wall in the lower two-thirds of the

tympanum proper. Though this portion of the middle ear be diseased to the extent of the formation of polypi and granulations, it is readily reached through the external meatus, so that this diseased tissue can readily be removed and free drainage secured by milder means, and in a manner that is less likely to damage the hearing so seriously.

In most cases of otitis media when the disease is confined to the middle ear proper, we have but little trouble in curing the disease. It is only when the process extends to the attic or to the mastoid antrum, that is, to points which we cannot reach readily through the external meatus, that the disease is so frequently incurable without the radical operative measures, namely, the Stacke and Stacke-Schwartze operation.

Viewing the subject from this standpoint my last Schwartze-Stacke operations have been made so that the antrum and the attic were thoroughly exenterated and curetted, but the labyrinthine wall in the lower two-thirds of the tympanum proper has not been encroached upon; that portion being left to be treated subsequently through the external meatus. The results have been very gratifying as regards the amount of hearing saved or regained. One is thus enabled to use small wire curettes and carefully clear away diseased tissue from the labrinthine wall, from around and about the stapes and its foot plate, without dislocating it and by means sufficiently mild to preserve its integrity and function.

During the successive steps of the radical operation, we come to a point where the malleus is carefully lifted out together with the tympanic membrane, and subsequently the incus. These are the two principal structures occupying the attic and exposes at once the tympanum proper which is lined with mucous membrane and may or may not be extensively diseased. At any rate the tympanum proper is thus thoroughly exposed and drainage from it unobstructed, and so thoroughly exposed are its walls and easily reached through the external meatus that there is no reason for applying the heavier mastoid curettes to it, which must necessarily endanger the stapes or its foot plate or the labyrinthine wall, and thus remove every possibility of preserving or regaining the function of hearing.

By leaving the tympanum proper to be dealt with subsequently, the other steps of the radical operation, namely, the thorough exenteration of the attic and the mastoid antrum can be proceeded with as usual. When the operation is finished and the skin flaps formed by the cartilaginous meatus held in place by gauze packed in the external auditory meatus, the very pressure of this packing exerted upon the granular mucous membrane of the tympanum does much to promote its absorption and bring about a healthy condition of it. When the skin lining of the newly formed enlarged cavity has so far advanced that we have more or less of a dry cavity to deal with, the labyrinthine wall and stapes can be dealt with much as we would treat a chronic suppurative otitis media with the disease confined to the tympanum proper, that is cleansing with alcohol, the careful use of the small wire curette for the removal of granulations or the careful application of chromic acid to these points, or the dusting over the surface with aristol and boracic acid powder as best seems indicated in the case, and very gratifying results obtained. In fact, since modifying the radical operation as detailed above, the result in hearing has been quite equal to that secured by the treatment of the ordinary chronic suppurative otitis media without attic or antrum involvment.

The object of this precaution in the technique of the radical operation is, as I have said, to preserve and protect the labyrinthine wall and to leave the stapes intact. To the extent that this is successful the mucous membrane lining of the tympanic cavity is preserved intact, and not infrequently when both the external and internal wound have completely healed and the case is ready to be dismissed, a little mucous discharge will collect in the meatus from time to time, necessitating occasional cleansing of the external meatus by the patient with a little borric acid solution. If the discharge is sufficient to give the patient much annoyance, a few drops of 10 per cent. protargol solution dropped into the ear after the cleansing, diminishes it and makes it quite tolerable cosmetically. In some of my cases there has been a small quantity of this mucous discharge. I have not sought to arrest it entirely, for by doing so the hearing has nearl y always been reduced. It

seems to serve the purpose of keeping the mucous membrane about the stapes flexible and serving to a certain extent as an artificial drum, and only requires of the patient a little additional detail in the matter of a toilet, to give him serviceable hearing. This mucous accumulation can do no possible harm; the attic and mastoid antrum having been obliterated in one large cavity lined with skin with ample room for exit through the external meatus, it is not probable that any trouble in the way of retention can take place.

I have no doubt that many of my colleagues have already modified their radical operations along these lines, but never having seen any reference to such modification in any one of the descriptions of the Schwartze-Stacke operations either in the text books or in literature on the subject, has prompted me to simply call your attention to it.

XLV.

REPORT OF A CASE OF RAPID NECROSIS OF THE TEMPORAL BONE FOLLOWING SCARLET FEVER.*

By Francis R. Packard, M. D.,

Professor of Otology at the Philadelphia Polyclinic: Aurist to the Out-Patient Department of the Pennsylvania Hospital.

The case which I desire to record presented several points which seemed to me of sufficient interest to warrant reporting to this society, namely the rapidity with which necrosis of the temporal bone occurred in connection with suppurative otitis media, the extent to which the necrosis developed on one side as compared with its absence on the other, and the negative character of the bacteriologic findings.

S. E., a boy, Russian, 4 1/2 years of age, presented himself at the dispensary of the Philadelphia Polyclinic suffering from a suppurative otitis media affecting both ears. The history given by the child's father was that he had somewhat over two months previously been attacked with diphtheria and removed from his home to the municipal hospital; while in that hospital he had contracted scarlet fever. He had been discharged from the hospital a few weeks prior to his coming to the Polyclinic. Previous to these illnesses he had been absolutely healthy and no trouble of any kind had ever been noticed in his ears.

Examination showed the child to be fairly well nourished and healthy looking; there was some enlargement of the cervical glands on both sides of the neck; both ears were discharging profusely, the discharge being of a muco-purulent character, very thick, yellowish and offensive. After cleansing it was found that the right membrana tympani was practically entirely destroyed; there

*Read at the meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. D., June 2, 1902.

was a mass of granulated tissue on the site of the ossicles; no dead bone could be detected. After cleaning the left ear the external auditory canal was found to be almost completely blocked by a large sequestrum of bone. This sequestrum when touched with a probe was movable, and pressure would sqeeze from under it bubbles of fluid and air. Several polypi immediately surrounded the sequestrum; they were small and did not interfere greatly with the view of the part. There was no tenderness over the mastoid nor any other indication of trouble in that region.

The father was told that it would be necessary to operate for the relief of the child's condition, but declined to give his consent to the operation for some days. During this interval the child's ears were cleansed and the polypi and granulation tissue removed as far as possible. The father finally allowed us to operate on the boy on the 13th of January, 1902.

The child was etherized at the Polyclinic Hospital, and, assisted by Dr. Walter Roberts, I performed a complete tympano-mastoid exenteration on the left side. The sequestrum which had been seen and felt in the external auditory canal was found to consist of the anterior portion of the outer wall of the mastoid and the posterior wall of the external auditory canal. On dividing the periosteum over the mastoid process, while pressing rather hard upon the knife, the whole cortex was found to be loose and came away as one piece about the size of a quarter of a dollar. Besides this there were two or three other pieces of necrosed bone the size of a dime, with large cholesteatomatous masses.

The subsequent course of the case was uneventful except for the occurrence of a facial palsy which developed about ten days after the operation: this has disappeared. The child's ear continues to discharge somewhat, although his general condition has been greatly improved.

Repeated bacteriologic examinations resulted in the finding of numerous streptococci and staphylococci but no Klebs-Loeffer bacilli in the discharge from both ears. Although the discharge continues in the ear which was not operated upon, there is no evidence of dead bone. I consider it interesting that the bacteriologic findings should be identical in both ears when the gravity of the affection varied so greatly in them.

XLVI.

THE RHINOLOGIST AN IMPORTANT FACTOR IN THE PREVENTION OF TUBERCULOSIS.*

By F. M. Pottenger, Ph. M., M. D.,

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The rhinologist, while at first looked upon with disfavor by the general practitioner, has made a worthy and enviable place for himself in the field of medicine. He has called the attention of the laity and the profession to the importance of normal physiologic respiration, and to the pathologic conditions produced where it is interfered with.

The importance of his work in the field of otology is shown by the fact that 70 per cent. of ear cases are due to causes situated in the nose and naso-pharynx. An eminent aurist has said that if the rhinologists would do their duty and attend to the nose and naso-pharynx of the children of this generation, there would be little use for aurists in the next generation.

His mission is of more importance and just as positive in the treatment of tuberculosis as it is in the prevention of deafness.

The nose, alone, was intended to conduct the air to the lungs, and for this purpose it was admirably fitted. The lungs should, if possible, receive none but pure air, and air of a tolerably constant degree of temperature and moisture; but wherever man dwells, he is subjected to dust and variation in the thermometric measurements. The nose, placed at the beginning of the respiratory tract, has as its important function, the preparation of the air for its entrance into the lungs.

The vibrissae stand at the vestibule and act as a strainer

*Read before the Western Section of the American Laryngological, Rhinological and Otological Society, at Los Angeles, California, April 3, 1902.

separating the particles of dust and bacteria from the air in its passage. Those which succeed in passing these sentinels, meet the moisture of the nasal cavity, are precipitated, and removed, partly by sneezing, partly by blowing the nose, and partly by the cilia waving them toward the throat, whence they are expectorated.

Next in importance is the change in temperature which takes place in the air. The mucous membrane of the nose is abundantly supplied with blood vessels, which, under the control of the vaso-dilators and constrictors, send more or less blood to the part as necessity demands. Thus the air from the frozen north or the hot tropical desert can be tempered by the same mucous membrane in the short space of time necessary to pass from the tip of the nose to the pharynx.

This same mucous membrane moistens the air and renders it free from irritation.

Where nasal respiration is interfered with certain changes take place in the economy which are well known. Those suffering from nasal stenosis have a dull heavy look; the outlines of the face are changed; and in many instances the bony framework of the chest is deformed; but, what is of most importance to the individual, is the general lowering of vitality and chronic catarrhal condition which such breathing induces.

Remembering that the currents of air in the nose take an upward course and pass backward along the superior meatus, striking the oro-pharynx at its uppermost portion, we see that a hypertrophied middle turbinal is of far more importance pathologically than a similar condition of the inferior turbinal, and that spurs and septal deviations which run up toward the roof of the nose are the ones to correct for nasal stenosis. We can also understand how a little mass of adenoid tissue filling the upper portion of the naso-pharynx will cause serious mouth-breathing.

Aside from the induction of mouth-breathing, the enlargement of the lymphoid tissue forming the tonsillar ring, affords a pathologic condition which offers an easy entrance to the germs of disease. It has been shown that the specific germ of several diseases gains entrance to the body through the tonsils, notably acute rheumatism, scarlet fever, chorea and tuberculosis.

Tubercle bacilli are often found in the tonsils when there is no tuberculosis present in other parts of the body. Dieulafoy inoculated sixty guineapigs with tonsillar tissue; eight, thirteen per cent. of them, succumbed to tuberculosis. He also inoculated thirty-five guineapigs with adenoid tissue; of these seven, twenty per cent., succumbed to tubercolosis. In none of these was tuberculosis present in the subject from which the tissue was taken. While these experiments have been disputed by some observers, they have been confirmed by the carefully conducted experiments of Lermoyez, Brindle and Gottstein.

Though tubercle bacilli are not always found in tonsillar and adenoid tissue in sufficient numbers to infect guineapigs, nevertheless they are found in these tissues in individuals who are apparently free from tuberculosis, which fact leads to the inference that the tonsils and adenoids may be ports of entry for the tubercle bacillus, whence it passes on into the lymph stream.

The long accepted theory, which accounted for infection of the lungs by direct inhalation of bacilli, has much to account for. If respiration be normal, germs, to so enter, must withstand the action of the vibrissae, the nasal mucus, the attempts to throw them out by sneezing and blowing the nose as well as the ever active cilia of the epithelium If mouth-breathing be present, they encounter the moisture of the oral cavity, which precipitates them upon the mucous membrane, there to gain entrance to the tissues or to be cast off with the expectoration. Whether respiration be normal or whether mouth-breathing be present the residual air in the lung will be a force sufficient to render the possibility of direct infection of the finer air passages and air cells almost nil.

In place of the direct inhalation theory then we are forced to the conclusion that the common channel of infection is through the lymphatics. Baumgarten has thrown much light on this subject by recent experiments in which he succeeded in producing apical tuberculosis by injecting small quantities of tubercle bacilli into the urethra, bladder, under the skin and into the eye. From all of these points of inoculation the bacilli were carried, through the lymphatics, into the apex of the lung, where they formed tubercular nodules. With such evidence before us, the

role of the rhinologist assumes increased importance. Tubercle bacilli are breathed in daily, but under normal conditions the organism is able to throw them off; but, when nasal respiration is interfered with, there is great danger, for then the organism has lost the protection which nature has provided against such invaders, and the only chance of ejecting the bacilli is through expectoration. The catarrhal condition which naturally exists where nasal respiration is interfered with, offers greater opportunity for germs to gain entrance. Osler says: "A special predisposing factor in lymphatic tuberculosis is the catarrhal inflammation of the mucous membrane, which, in itself, excites slight adenitis of the neighboring glands." It is not necessary to have a catarrhal condition of the mucous membrane present, for the bacilli are able to enter either by inter- or intra-cellular channels through the healthy mucous membrane, as has been shown by Orth, Klebs, Baumgarten and others; nevertheless, such a condition, when present, greatly facilitates their passage. Wright says: "We must assume at present that the tubercle bacillus passes into the lymphatics through the mucous membrane of the naso- and oro-pharynx in a very large proportion of cases of pulmonary infection."

The rhinologist must assume the responsibility of protecting the organism against the tubercle bacillus. While catarrh does not run into consumption, nevertheless mucous membranes affected by it possess a lowered resistance and are the seat of small abrasions, which offer an easy entrance to the tubercle bacillus.

It is not only the part of the rhinologist to prevent infection by keeping the mucous membranes in a healthy condition, but he also has the opportunity to diagnose the disease in its incipiency; for it is to him that those in the early stages of tuberculosis are apt to come for relief from a slight though persistent cough, especially after talking or laughing or a protracted cold, which refuses to yield to ordinary measures. Coughs and colds, not yielding to treatment in a reasonable time, should be branded as suspicious. A two-hourly temperature chart of such cases often gives valuable information. In all such cases a careful examination of the chest should be made and the clinical history should be carefully elicited.

It is of much importance to the individual to know at the earliest date possible if tuberculosis be present, so no measures should be omitted which will throw light on the diagnosis. With a thoroughly trained ear, the tuberculin test, the Roentgen rays and the microscope, we are able to detect tuberculosis in the incipient stage in nearly every instance that comes to our notice, before the stage of consolidation. With the first two, most cases can be detected before bacilli appear in the sputum.

The chances of cure in tuberculosis decreases as time passes. In the early stage from sixty to ninety-five per cent. of the cases are being cured. Turban of Davos says that ninety-seven per cent. of those in the early stage should be cured. How hopeful this disease, then, if only an early diagnosis be made!

As rhinologist then we must assume a two-fold duty in the fight against tuberculosis. We must keep the upper air passages healthy and thus diminish the chances of infection and we must be able to diagnose the disease in those incipient cases which seek relief at our hands.

Bradbury Block.

XLVII.

SPASMODIC TORTICOLLIS FOLLOWING AN ADENOTOMY.

By J. M. Ingersoll, A. M., M. D.,

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Spasmodic torticollis is an affection characterized by tonic or clonic spasms of certain muscles of the neck, by which the head and cervical spine are rotated or drawn backward.

From an etologic standpoint this affection is entirely distinct from congenital wry neck, but the resulting condition is similar. One sterno-mastoid muscle is contracted spasmodically and stands out prominently. The other rotatory muscles of the head may be involved. The chin is turned toward the opposite side and upward. The head is inclined toward the affected side. The spasm may be tonic or clonic, and ceases during sleep. Spasmodic torticollis occurring as a consequence of operation of any kind is very rare. In an exhaustive search through the literature, foreign as well as our own, I have been able to find the report of only one case following, and apparently due, to an adenotomy.

This case was reported by Dr. J. F. McKernon.[1] The patient was a girl, nine years old, and was first operated upon for enlarged tonsils without an anesthetic. Two days later, an adenotomy was done, under ether. There was a large amount of adenoid tissue. It was unusually firm but was thoroughly removed with a Gottstein currette. Twenty-four hours after the operation, the Doctor noticed that the patient's face was turned toward the right shoulder. The head could be manipulated and turned back to the median line, without pain, but when it was released it slowly turned back toward the right. Examination of the

naso-pharynx showed a small mass of adenoid tissue remaining on the right side.

Doctor Terriberry, the consulting neurologist, saw the case and expressed the opinion that the condition was a purely reflex one. The case was treated according to this hypothesis. Sedatives were given internally and counter-irritation was applied over the back of the neck. The remaining mass in the naso-pharynx was not removed. One week after the operation, the position of the head was improved and by the ninth day the head was in the normal position.

This case was seen by Doctors Morris J. Asch and Charles Knight. Doctor Knight reported the case to the Neurological Section of the New York Acadamy of Medicine, February 16th, 1894. He says there are three ways in which the symptoms might have been produced: (a) by an actual wound of the rectus muscle, (b) by contusion of the muscle from extraordinary pressure in curetting, (c) by a lesion of the nerve filaments in the mucous membrane resulting in a reflex irritation of the muscles engaged in rotating the head. The first and second theory could be excluded and the third seemed to explain the symptoms.

My own case occurred in a well nourished boy, seven years old, who was brought to my clinic in the Lakeside Hospital. His family and personal history were good. He had a typical adenoid expression, but otherwise appeared to be normal. The nasal fossae contained a small amount of muco-purulent secretion and the inferior turbinals were slightly hypertrophied. The pharynx was granular and and the naso-pharynx was filled by a mass of adenoid tissue. Cocain was applied and the adenoid tissue removed with a Gottstein curette. The amount of hemorrhage was slight, and the boy said that the operation had not hurt him much. About an hour after the operation he was sent home with his mother.

Two days later he returned with a typical torticollis. The right sterno-mastoid muscle was tensely contracted. The other rotatory muscles of the head did not seem to be involved. The head was drawn toward the right side, and the chin pointed upward and toward the left. His mother said that about three hours after the operation he

complained of pain in his throat and his face was turned toward the left. This condition had continued during the day but disappeared at night, when the boy was asleep.

An examination of the nose and naso-pharynx showed that the operation had been complete. The adenoid tissue had been well removed and the site of the operation was healing nicely. There was no apparent injury to any of the surrounding structures. The boy had behaved so perfectly at the operation, that I could exclude the possibility of having used undue force in operating.

The only explanation of the torticollis seemed to be to consider it a reflex neurosis, and I decided to treat it by suggestion. I began to massage the right sterno-mastoid muscle and with firm pressure turned the head back to the normal position, assuring the boy that the manipulation would cause him no pain and that his head and neck would be freely movable, or remain in the proper position. While he remained in the clinic, the torticollis did not recur, but when he came back two days later, his mother said that the spasm had returned soon after they had left the clinic, but that it was less marked than at first. He was treated in the same manner as on the previous visit and the torticollis was easily overcome, and did not recur. When I saw the patient the last time, ten days after the operation, he appeared perfectly well. The naso-pharynx was in good condition and there had been no return of the torticollis.

The treatment by suggestion and massage, may have hastened the recovery a little, but I think that the boy would have recovered without any treatment.

Cases of spasmodic torticollis, originating reflexly, have been reported. Noble Smith in his exhaustive treatise on spasmodic torticollis,[2] makes no mention of this affection occurring as a consequence of operation of any kind, but refers to a case[3] of a child three years old, in whom a severe blow upon the clavicle was followed by spasmodic torticollis. He also mentions a case,[4] reported in 1813, in which spasmodic movements of the tongue, face and neck, after resisting other treatment, were cured by the removal of some badly diseased teeth.

Hancock, in 1859, reported a case,[5] of non-spasmodic torticollis of six months standing, which was relieved by

the extraction of a decayed tooth from the lower jaw.

Cases caused by disease of the eye have been reported by several observers.[6] Other cases have also been attributed to diseases of the ear.[7]

A. J. Gillette has reported two cases of torticollis, which were benefitted or cured by adenotomy[8]. One of these was a case of congenital torticollis in a child sixteen months old. The tonsils were hypertrophied and the vault of the pharynx filled with adenoid tissue. An adenotomy and double tonsillotomy were done and the torticollis disappeared and had not returned three months after the operation.[9] The second case was a child three years old, in which the torticollis had been present for six weeks, and was cured by adenotomy.

It seems reasonable, therefore, to suppose that in my case the irritation caused by the operation in the naso-pharynx produced reflexly through the gloso-pharyngeal and spinal accessory nerves, the spasm of the sterno-mastoid muscle, and so caused the torticollis.

BIBLIOGRAPHY.

[1]McKernon, Manhattan Eye and Ear, Hospital Reports, N. Y., 1884.
[2]N. Smith, Spasmodic Wry Neck, London, 1891.
[3]The Lancet, London, April 17, 1880.
[4]John Mitchell, Medico-Chirurgical Transactions, London, 1813.
[5]The Lancet, London, 1859, Vol. I, p. 80.
[6]Landolt, Bull. Med., Paris, 1890.
Lovett, Tr. Am. Orthop. Ass'n, Philadelphia, 1889. Vol. II, p. 230.
Wadsworth, Tr. Am. Ophth. Sec., 1889, p. 381.
Bradford, Tr. Am. Orthop. Ass'n, 1887-8, Boston, 1889, Vol. I, p. 46.
[7]Gelle, Le torticollis ab aure laese, Am. d. mal. de l'orielle, Paris, 1859, Vol. XXI, p. 351.
[8]Gillette, Torticollis due to Adenoid Vegetations and Chronic Hypertrophy of the Tonsils. Tr. Am. Orthop. Ass'n, Philadelphia, 1896, Vol. XIX, p. 170.
[9]Shadle, Torticollis and Adenoid Growths, Jour. Am. Med. Ass'n, June 6, 1896.

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XLVIII.

A CASE OF EPITHELIOMA OF THE AURICLE AND AUDITORY CANAL.*

By Thomas R. Pooley, M. D.,

NEW YORK.

Cases of epithelioma of the external ear are of such comparatively rare occurrence as to warrant the report of any case, especially when the results of the treatment can be shown by the presentation of the patient. This alone is my excuse for presenting this patient to the society with a brief account of the case.

The patient, aged fifty-eight, came to my clinic in the New Amsterdam Eye and Ear Hospital on September 17, 1900, with the statement that he had first noticed a nodule on the auricle some five years before, which came in time to be an ulcer. From the commencement, although it had been treated with various salves, caustics and pastes, and once by operation, it gradually increased in extent until he sought my advice.

Status Præsens.—Situated in the upper part of the helix, just about the region of the anthelix, was a growth, nodular in character, extending downward, from the lower part of which growth there was a whitish reticular tissue, somewhat similar to cicatricial tissue, involving respectively the concha, tragus, antitragus, and extending into the auditory meatus. The dimensions of the growth were half an inch in length by three-quarters of an inch in width.

The patient being etherized, a transverse incision was made along the upper margin of the growth, then two vertical ones on either side, and all the suspicious tissues carefully dissected out. At one place in the meatus, where the growth seemed to invade the deeper structures

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of the auditory canal, it was scraped out with a sharp spoon, as was also some of the cartilage of the concha. In this dissection a considerable amount of the cutis of the helix, the tragus, and the antitragus was excised.

The upper part of the auricle was then drawn forward by a continuous suture, and the lower part by two interrupted sutures, thus decreasing considerably the size of the wound resulting from the gaping of the incisions.

The healing was soon accomplished, but there was considerable swelling, redness, and the formation of blisters over the area of operation and extending over the adjacent surfaces, which resembled very closely erysipelas, but as there was no rise of temperature, I concluded it to be due to poisoning from iodoform gauze. This being replaced by simple, sterile gauze, healing rapidly took place, and the patient left the hospital in one week.

On October 24th the wound had entirely cicatrized, and I saw nothing more of the patient until January 2, 1902, when he returned with a recurrence of the disease, which is described in the hospital record as follows: "A nodule about the size of a pea, $1/2''$ in front of the tragus, and a deep erosion at the posterior and outer part of the auditory canal, about $1/2''$ square and extending for some distance into the canal. Another deep ulcer $1/4''$ wide at the junction of the lobule with the cheek. An operation was done the same day with the patient under ether, which consisted first in circumscribing with a scalpel all of the diseased tissue in the auditory meatus, then by means of it and strong scissors removing it, after which by means of a sharp spoon all suspicious tissue was carefully scraped away until in some parts of the anterior wall of the canal the periosteum was removed down to the bone. The small growth in front of the tragus was then excised, as was also the deep ulcer in the cleft of the lobule. Finally, the wounds left by the excision of the growth in front of the tragus and the lobule were drawn together by sutures, the meatus packed with sterilized cotton, the wound covered with iodoform gauze, and cotton, and a firm roller bandage applied."

On the day following the dressing was removed and no unfavorable symptoms were noticed. That night, however, the temperature rose to 100°, and the pulse to 100,

and the next morning the right side of the face was swollen almost beyond recognition. The swelling included the whole auricle and involved a number of glands in the neck. There was intense redness, with numerous small blebs. All this was limited exactly to the median line. A diagnosis of facial erysipelas was made, a solution of acetate of lead and opium applied, and half a teaspoonful of tincture of chlorid of iron given three times a day. Under this treatment the condition rapidly subsided; the temperature rose only to 101°, and the pulse to 110, and by January 7th the swelling and the redness were gone and the temperature and pulse were normal. During this entire phase of his condition the favorable granulating of the wound was never interfered with, and the patient was discharged January 9th, just one week after the operation.

Considering the rapid healing and the inconsiderable constitutional symptoms, I am led to believe that the reaction here, as after the first operation, was an acute dermatitis due to iodoform poisoning and not to facial erysipelas, especially as it occurred after both operations, and soon got well after the iodoform gauze was left off. The further healing of the wound has been slow, by granulation, and there is now complete cicatrization except for one minute ulcer on the upper wall of the meatus. Whether this is a place which has not entirely closed, or is a return of the growth, I leave undetermined.

According to Politzer, the starting point of epithelial new formation is most frequently the auricle and the external meatus, less frequently the tympanic cavity and mastoid process.

On the auricle the epithelioma is usually developed in the cutis on the upper part of the helix, and spreads from there at first gradually and then very quickly over the greater part of the auricle, the cartilage of which is ulcerated in various parts and perforated.

If an epithelioma of the auricle is not excised in time, it spreads, involving the side of the head and neck and (as it did in my case) the auditory canal, then the middle ear and the rest of the bones of the head and cranial cavity. The destruction may reach such an extent that not only is the middle ear exposed, but also deeper parts of the skull, and a fatal termination ensues. Thus, in a case

reported by Delstanche fils (*Archiv für Ohrenheilkunde*, xv) the growth proceeded from the inner surface of the right tragus and extended so far that the tympanic cavity and Eustachian tube, the posterior part of the frontal bone, the lining of the sphenoid bone and the posterior wall of the orbit were destroyed and exposed. Symptoms accompanying this destruction were facial paralysis, amaurosis, loss of taste and smell, and paralysis of the right palatine muscles. Death resulted from the extension of the cancer to the dura mater. In my judgment the proper and only treatment for epithelioma of the auricle, whenever this is possible, is excision of all the growth well into the healthy tissue. This may at times be impossible, however, and then we must resort to its destruction with lunar caustic, zinc paste, the application of fuming nitric acid, the electric cautery, and the like, or the use of the toxins and X-rays. All such measures are, however, unsurgical and unreliable, and should be "cast as rubbish to the void," whenever the knife, scissors, sharp spoon, or other sharp methods are possible.

XLIX.

SUPPOSED CAVERNOUS SINUS THROMBOSIS.*

By Ewing W. Day, M. D.,

PITTSBURG.

Aside from the desirability of reporting obscure cases involving the cranial cavity, that each may add its share to the existing knowledge, it is also well to confess our manifold mistakes and errors, as well as to cry abroad our achievements. In both the following cases the first diagnosis was wrong, and the final diagnosis was proven only in the second case and, from these facts, they present several interesting points.

Harry H., aged 11, was admitted to the Children's Hospital on the evening of January 7, 1901. Family history negative. The previous history of the child, so far as could be ascertained, was that ten months previous he had had measles, and four months ago an attack of typhoid fever. On admission to the hospital the child was very anemic and emaciated. He had had purulent discharge from the right ear for the past eight months. This discharge had been gradually becoming more profuse. The glands in the right cervical region were enlarged and tender to pressure, and over the right mastoid a sinus leading into the middle ear was discharging pus. The temperature of the child on admission was 103; pulse, 120.

As the patient presented all the symptoms of septic infection an immediate operation seemed advisable. He was operated upon that night at 10 p. m., with the assistance of Drs. Ewing and Milligan, and the mastoid freely opened. It was found to be broken down and filled with necrotic bone, granulations and pus. The swelling below the mastoid was punctured with a large aspirating needle but no pus obtained. The lateral sinus was free from involvement.

*Read before the American Laryngological, Rhinological and Otological Society, Washington, June, 1902.

The wound was dressed and the next morning his temperature had fallen to $97^{3}/_{5}$; but by evening had risen to $100^{1}/_{5}$. On the second day his temperature went to $104^{2}/_{5}$.

It being evident that all of the pus had not been evacuated an incision was made through the swelling in the neck and a pocket found containing a large amount of pus. This was evacuated, drainage tubes were introduced, and the wound again dressed. For the next two days the temperature, as a result of septic absorption, ranged from $104^{2}/_{5}$ to normal, with slight chills.

On the morning of the 12th the patient's right eye was found swollen, the lid slightly discolored, and the tissue tense from pressure. The next day the discoloration had increased. All movements of the eyeball were lost, it being held rigid by the swollen tissues. The lids could only be partially closed.

The eyeball was pushed forward by pressure from behind. At consultation Dr. Robinson made the following report after examination of the eye:

The conjunctiva of the right eye was chemotic—the lids edematous, cornea clear, the eyeball protruded and limited in its excursions—the pupil was semi-dilated, but reacted to light stimulus. With the ophthalmoscope the

ocular media were all clear and transparent: the optic disc and the retinal vessels were readily seen and presented no gross abnormalities. There being no conjunctival nor corneal infection and the ophthalmoscopic examination excluding panophthalmitis. The ocular symptoms were believed to be due to retro-bulbar pressure. Accordingly an incision was made into the orbit and the orbital cavity thoroughly explored for a tumor or abscess—neither was present, the orbit being completely free from pus. This incision temporarily relieved the tension on the globe.

There was but little blood from the incision and this of a venous nature. The diagnosis of infective thrombosis of the cavernous sinus was made. The patient was closely watched and hourly temperature readings taken for the anticipated septic changes.

The temperature on this day had fallen, and the general condition of the patient seemed improved. On the 16th, or 4th day since the eye involvement appeared, the discoloration in the upper lid had increased and a gangrenous area about the size of a dime was formed on the lid below the line of the incision. The swelling was so great that at no time could the condition of the muscles of the eye be determined as to involvement of the several nerves. On the 19th the temperature reached 104 degrees for a short time, but on the whole there was a noticeable improvement in the patient. On the 22nd the gangrenous patch below the incision was sloughing. Ulceration and sloughing of the cornea began with a free muco-purulent discharge, caused by the pressure, together with the lack of protection from the lids.

The patient's temperature was varying from 100 to 103, with a rapid, thready and weak pulse requiring the free use of stimulants. On the 25th, or 13 days after the first involvement of the right eye, the left eye had commenced to swell and the lids to be discolored as in the right eye. Ophthalmic examination of this eye, made by Dr. Curry, was a duplicate of that of the first eye involved, made by Dr. Robinson. It was also impossible to determine the condition of the muscles of this eye on account of the great distension of the tissues. On the 28th the swelling in the left eye had increased; in the right eye it had decreased. The mastoid wound and the neck during this

time were granulating slowly, and there was some purulent discharge from the neck. The temperature was now near the normal mark, though the patient was very weak and showed signs of exhaustion. The tissues around both eyes seemed gangrenous. On February 2nd, the swelling in the right eye was decreasing, in the left eye was increasing, and the cornea sloughing; a purulent discharge was now present. The general condition of the patient was fair. Temperature nearly normal, pulse from 112 to 140.

This state of affairs continued until February 26th, when the temperature arose to 105, the patient complaining of pain over and below the mastoid wound. This old wound, which had been allowed to close, was again opened by Doctors Ewing and Milligan and thoroughly curetted, a quantity of pus evacuated and some necrosed bone removed.

For the next eight days there was a gradual lessening of the temperature variation until on March 6th it passed to the sub-normal line.

The patient at this time was extremely emaciated, his weight being $44^1/_2$ pounds. There was total loss of sight in both eyes. The ulceration of the cornea of the right eye had been so far controlled that the eyeball had not ruptured, but the left orbit had collapsed, and there was still a free discharge of pus from the orbital cavity.

The patient from this time until the date of his discharge slowly gained in strength, and the temperature never rising above 99. He was transferred to the Blind Asylum May 27th. The mastoid wound was healed, the right eye somewhat shrunken, the cornea covered with scars, probably the cause of blindness in this eye. The left eye collapsed, and the conjunctiva and iris could be seen deep in the socket.

In making a diagnosis of this case, our first impression is that we have to deal with thrombosis of the sinus of an infective nature. The fact that the boy had a purulent mastoiditis, though there was no involvement of the lateral sinus, made us conclude that in some way the purulent infection had been transmitted by some other route to the sinus which seemed so clearly involved.

The case presents many variations from typical cavernous sinus thrombosis.

Between the involvement of the first and second eye a lapse of thirteen days occurred, the usual time being over forty-eight hours.

In infective thrombosis in this locality we would necessarily have marked systemic manifestations. Here, however, the high temperature with its wide variations was wanting, and there were none of the signs of pyemia that did not improve when the mastoid was evacuated; moreover, infective thrombosis of this locality is invariably fatal.

The fact that this case recovered is enough of itself to prove that the thrombosis could not have been of the septic order. If a thrombosis was present it must have been a primary or non-infective one.

One point is especially interesting, that in the symptoms the chronic purulent otitis media was supposed to be a very important causative factor, but it proved in the end to be a coincidence without significance.

Edema of the lids, conjunctival chemosis, fixation and protrusion of the eyeball are symptoms seen in tenonitis, abscess of the orbit, panophthalmitis and thrombosis of the cavernous sinus. The ophthalmologists, Doctors Robinson and Curry who attended to his eyes throughout the disease, stated positively that tenonitis and abscess of the orbit were not present, that there was no panophthalmitis prior to the ulceration and sloughing of the cornea, but may have been present later from absorption through the abraded surface.

Primary thrombosis in the cranial cavity is almost always in the longitudinal sinus; rarely in the lateral and still more rarely in the cavernous sinus and occurs mostly at the extreme of life. The clots are resistant, dense, stratified, and non-adherent to the walls of the vein. They show a marked tendency to be organized or absorbed, and very rarely disintegrate.

The symptoms of primary thrombosis are often uncertain and are prone to be masked by the disease which precedes and which is the cause of the trouble.

The diagnosis is dicffiult and is seldom definitely determined during life. There are none of the characteristic symptoms of temperature which are found in infective thrombosis.

When the thrombus is located in the cavernous sinus, though one sinus is affected at the outset, yet thrombosis in the majority of cases spreads through the circular sinus to the cavernous sinus on the opposite side. The symptoms, though unilateral to start with, later become bilateral.

The sinus in which the symptoms are first noticed, as shown by the exophthalmos, may be partly restored, while the opposite side becomes markedly affected. This alteration of the seat of the symptoms is diagnostic between abscess of the orbital cavity and cavernous sinus thrombosis.

There are two principal groups of symptoms generally present; one dependent on venous obstruction, and the other on a paralysis due to the pressure on the nerves supplying the cavernous venous plexus.

In considering the symptoms of this case, we have a patient who had within ten months passed through measles, typhoid fever, and sepsis from a purulent mastoiditis and abscess of the neck, producing an exhaustion favorable to the forming of a primary clot.

The symptoms were first marked exophthalmos, of the right eye; great edema of the eyelids and the corresponding side of the root of the nose. There was an absence of any characteristic temperature symptoms.

It was impossible to determine whether there was paralysis of the 2nd, 3rd, 4th, 6th, or the first division of the 5th nerve, on account of the great edema and the distension of the tissues.

After 13 days the second eye was involved rapidly, causing the same symptoms and appearances that were present in the first.

Coincident with the appearances in the second eye, there was a subsidence in the first eye affected. The implication of the second eye, if too long an interval does not intervene, is very indicative of thrombic extension to the opposite cavernous sinus.

While, as we have said, the diagnosis is unproven, still the writer believes the following is the most probable one: That in the beginning we had a primary thrombosis of the right ophthalmic vein, which slowly extended back to the right cavernous sinus and then to the left sinus and terminated in absorption or organization of the clot.

L.

TUMOR OF CEREBELLUM.*

By Ewing W. Day, M. D.,

PITTSBURG.

Alpha M., aged 7, was admitted to the Children's Hospital, April 18, 1901. At the time of admission previous history was not obtainable but will be given in proper place. The father and mother were full cousins. They had a family of five children. An elder sister of the patient was "not bright." A young brother was hemiplegic. The child had chronic otitis media of both ears at intervals since infancy. In October of 1900, the patient was subject to headaches, coming on at variable intervals. These attacks were very severe and would last for hours. When the pain was at its height there was some convulsive contractions of the muscles of the body. This would be followed by vomiting, after which the patient would fall into a deep, heavy sleep. The left ear at this time began to discharge pus, with occasional slight earaches. The temperature was slightly subnormal. Pulse 75 to 85. These symptoms continued until his admittance to the hospital. In January there was noticed a failure in vision and a slight staggering in his walk.

Condition at time of admission: The child was well developed, though emaciated. Severe headaches, referred mostly to the frontal region. The hearing in both ears nearly normal. Right ear, no discharge. Tympanic membrane destroyed and the presence of necrosed bone in the tympanic cavity determined. Left ear, same as right, but a free purulent discharge present. No swelling over mastoid but some tenderness on deep pressure. Percussion also caused the patient to flinch.

There is no paralysis except of the sixth nerve on the right side. Knee jerks normal. There is a slight but dis-

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tinct staggering and swaying in walking. Patient cannot see a pin dropped on the floor before him, but has to grope for it. Percussion over the coronal suture on both sides of the median line brings out a distinct cracked-pot sound but causes no pain.

Examination of the eyes: Patient has a convergent strabismus. Right eye, external rectus shows some weakness and the excursion of the eye is limited outward. The strabismus is very noticeable but not complete, the external rotators have some power. The pupils are equal and react promptly to light.

Ophthalmoscopic examination: Right eye, media clear. Disc shows a decided optic neuritis, apparently subsiding. In macular region are many white spots, very similar in appearance to albuminuric retinitis. Vessels in retina are tortuous and in places obscured. Left eye same as right.

Urinary analysis: Color clear. Reaction acid. Specific gravity, 1020. No albumin. No sugar. No casts.

The temperature was normal, and pulse 96.

In considering the history of the case at this time we had the following prominent points: (1) Age. (2) The purulent discharge from both ears during entire life and some tenderness over left mastoid on percussion. (3) Optic neuritis. (4) Paralysis of sixth nerve on right side. (5) Cracked-pot sound over coronal suture. (6) Slight staggering gait. (7) Severe headaches.

In making a diagnosis, lack of detail in the previous history was regretted. The only symptom that we might not expect to find in meningitis, cerebritis, syphilis, hemorrhage, or tumor, was purulent otitis media and to this great importance was given and the diagnosis of an abscess of the cerebellum on the left side was made and operation advised.

Operated upon May 20th. The usual mastoid incision and flap to uncover skull for trephining the cerebellum was made. The mastoid was opened and found normal. The skull was trephined over center of left cerebellar lobe. The dura and brain substance appeared normal but bulged somewhat into the trephine opening. The trocar was passed in different directions well into the lobe, but with negative results. The wound in the scalp was closed with sutures. The patient for the following week did

nicely and seemed to experience no bad effects from the operation. Temperature below 100, and pulse averaging 110.

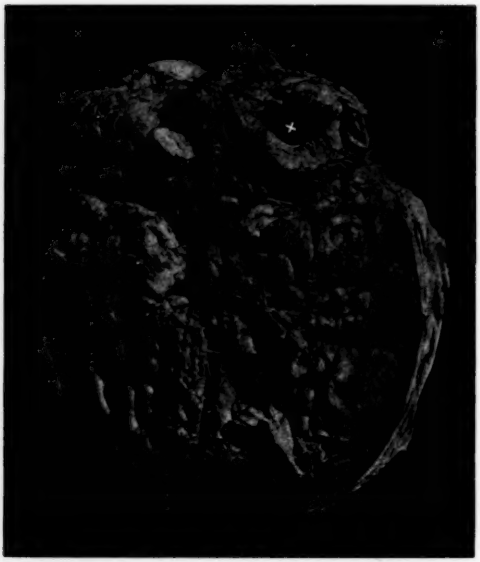
On May 30th there was a sudden rise of temperature to 104 $^{2}/_{5}$. Patient was very dull and stupid. A swelling with fluctuation was found over the trephine opening. This was opened, and some broken down brain tissue and clotted blood removed. A cerebellar hernia was present. The patient's condition from this time until his removal from the hospital changed but little. He was dull and stupid, and when aroused was cross and fretful. The hernia slowly increased in size. The headache was not present after the operation. By June 10th, complete optic atrophy had taken place in the left eye, and right eye progressing rapidly. June 18th was removed by parents. Patient was very dull and hard to arouse. When aroused would take nourishment freely.

After June 10th, the temperature was mostly subnormal, at one time reaching 96. Pulse from 75 to 100.

On May 6, 1902, or nearly a year after the operation, I was permitted, with Doctors Irons and Mayer, to again examine the case. Since leaving the hospital the patient required attention like an infant. There was very pronounced hydrocephalus, the head having increased greatly in size. There was spastic paralysis of right and left leg and left arm, with increased reflexes and general clonus, most marked on left side. Cracked-pot sound over both sides of coronal suture, but percussion produced pain over right side. Over the old trephine site there was a hernia an inch and one-half in diameter. Sensation, speech and organic reflexes were apparently normal.

On May 16th, there was a rise in temperature to 102 and pulse rate to 120. From this time until May 20th, there was a slow, but steady increase in both temperature and pulse. The temperature reached 106 $^{1}/_{5}$, pulse very rapid and thready, and death followed in a few hours.

On turning back the scalp, the formation of a new bone along the lines of the principal sutures was marked, averaging one inch in width. The sutures were very loosely united, making the removal of the skull-cap, in one piece, difficult. The dura was adherent along the new bone formation of the sagittal suture. There was some softening



X, Section removed for examination.

of the frontal lobes, with fluctuation on palpation, due to the fluid within. In removing the brain from the skull it was impossible to prevent the escape of a large amount of the cerebro-spinal fluid, which, unfortunately, was not measured. The greater portion of the left cerebellar lobe had been forced through the old trephine opening, to which the scalp was adherent.

A tumor the size of a hen's egg was found in the right cerebellum, apparently arising from the middle of the lower surface of the right lateral lobe. It was confined to this lobe and did not involve the middle lobe or the cerebellar peduncles. The medulla was turned on its axis, nearly one quarter of a turn, by the pressure of the tumor. The lower middle lobe of cerebellum was softened. The left cerebellar lobe was atrophied to some extent from pressure.

The right sixth nerve was probably paralyzed by the tension put upon it.

The aqueduct of Sylvius was enormously dilated. The foramen of Majendie was closed by pressure and by adhesive inflammation, thus causing the internal hydrocephalus. The great distention of the ventricles does not show in the specimen on account of their collapse, due to the action of the hardening fluid.

LI.

A FOREIGN BODY IN EXTERNAL AUDITORY CANAL SIMULATING A SEQUESTRUM.

By W. H. Roberts, M. D.,

PASADENA, CAL.

Henry B., aged 6 years, was brought to my office September 18, 1901, suffering from earache of right ear. This ear had been aching for two days. He had suffered with more or less pain in it for three years and occasionally it had discharged pus. Examination was difficult, owing to extreme irritability of the child.

The canal was full of creamy, foul-smelling pus. This was removed by mopping, and after getting the canal as clear as possible, I noticed a grayish-brown object at about the site of the drum. This filled the canal from above down, leaving spaces along the anterior and posterior walls through which exuberant granulations presented, one anteriorly being decidedly polypoid. These granulations bled freely upon the slightest touch.

I tried to remove the dark colored object, thinking that possibly it was a flaxseed, though I could obtain no history of anything having been introduced into the canal, but as the child screamed with pain whenever it was touched, I was obliged to desist. I then came to the conclusion that this must be a remnant of the drum membrane in a necrotic condition, from its long continued bath in pus. After insufflating a little boracetanalid I sent the child home, leaving the removal of the granulations for another day.

The next day the mother reported absence of pain. There was very little pus in the canal but the granulations had grown so rapidly as to almost conceal the so-called drum.

After a few days, during which time the granulations had entirely closed the canal immediately external to the drum (?) I attempted to curette the granulations under

chloroform. The hemorrhage was so profuse, not being in the slightest controlled by the solutions of adrenalin chlorid I then had in my office, that I was unable to accomplish much of anything.

When next able to make a satisfactory examination, I noticed what appeared to be a sequestrum, triangular in shape, the apex rising from the floor of the canal, pointing outward, movable, but so sensitive as to make removal impossible even under 10 per cent. cocain.

Thinking this object a sequestrum which I had caused to change position in the attempted curettement, I decided to remove it and all caries as well under an anesthetic. Dr. E. W. Fleming now saw the case in consultation and tried to remove the sequestrum (?) and failed. He agreed with me that an operation was necessary and that it should be as radical as was indicated after removing the sequestrum.

Two days later the child was admitted to the Pasadena Hospital. Under chloroform, administered by Dr. D. A. Conrad and assisted by Dr. E. W. Fleming, the operation was undertaken.

The canal was thoroughly douched with 1-3000 bichlorid, dried, and then I applied 1-1000 adrenalin chlorid which gave me a nearly bloodless field during the entire operation.

With a strong pair of forceps I grasped the sequestrum (?) firmly and removed—a triangular piece of cork! It measured about 1/2 an inch from base to apex and about the same across the base.

I then thoroughly curetted the granulations and found a practically normal drum. The site of the granulations I cauterized with carbolic acid followed with alcohol. The boy made a prompt recovery and has perfect hearing. He recalled having put a piece of cork in his ear several months before.

The points of interest in this case are:

1. The misleading history.
2. The discharge and granulations which with the difficulty in keeping the boy still long enough to make a careful examination made it practically impossible to make one.
3. The apparently intense pain caused by even touching the foreign body.
4. The fact that the drum membrane was uninjured and the great depth at which it was placed, being unusually far in for a child of his age.

LII.

SOME OBSERVATIONS ON OPERATIONS FOR MALIGNANT DISEASE OF THE MOUTH AND NECK.*

By George W. Crile, M. D.,

CLEVELAND.

The operation for malignant disease of the neck and mouth are based upon certain fundamental principles—the dangers may be classed as immediate, consecutive and remote.

The immediate, or operative dangers are shock and collapse; the consecutive danger is infective inflammation, especially pneumonia; the remote is the recurrence of the disease. Among the causes of shock and collapse, hemorrhage is prominent, not so much the hemorrhage from the larger vessels but the ever present oozing from the smaller. This form can be prevented only by definitely controlling the arterial supply.

Temporary closure of the internal carotid or temporary, or permanent closure of the external carotid minimizes the loss of blood.

Permanent ligature of the internal carotid as a routine measure to prevent hemorrhage during operations is not available since it carries with it a mortality rate of about 11 per cent. on account of cerebral complications. This method would cost more lives than it would save. Permanent ligature of the external carotid is available in the cases in which that artery may be reached without partially performing a tumor dissection in advance. In such cases two principles are violated. First, the tissue of malignant tumors should not be subjected to greater manipulation nor closer dissection than is absolutely necessary for their removal on account of dissemination. Second, there will be unpreventable loss of blood in reaching the artery. It follows that in cases in which ligature of

*Read at the 34th annual meeting of the Minnesota State Medical Society at Minneapolis, June 19, 1902.—From the St. Paul Medical Journal.

the external carotid owing to the position of either of the primary or the metastatic growth, involves more than the minimum loss of blood or more than the minimum manipulation of the tumor, temporary closure of the common carotid should be done. The unilateral anemia of the neck, face and mouth thus produced gives other advantages quite as important as preventing the loss of blood. The field of operation is kept clear, dissection may be made correspondingly more precisely and more quickly and the entrance of blood into the respiratory tract obviated. Certain operations that are most difficult are converted into cadaver dissections.

The writer has closed the carotid arteries 32 times since 1897 and has observed no unfavorable side effects. As a means of controlling arterial and capillary hemorrhage it is absolute.

The artery should be subjected to only sufficient pressure to approximate its walls. More than that is alike unsafe and unnecessary. Closure of the lumen requires but little pressure. Caution against a greater pressure must be emphasized.

The facility and accuracy of dissection of the bloodless field, especially, in the region of the important vessels and nerves, and more particularly in the dissection within the mouth is so much facilitated that more extensive operations may be safely done.

Next in the group of operations in the causation of shock and collapse is direct or reflex inhibition of the heart or of the respiration.

This is due to mechanical interference with the vagus or its branches, notably the superior laryngeal; while the trunk of the vagus may be considerably manipulated without producing changes in the heart or the respiration, the superior or laryngeal either in its terminus or the mucous membrane of the larynx or in its trunk causes reflex inhibition on even slight manipulation.

The effect upon the heart may be wholly avoided by administering a physiologic dose of atropin prior to operation, but there is no drug known whose constitutional action prevents respiratory inhibition.

Cocain locally applied either upon the trunk of the superior laryngeal or upon the laryngeal mucosa, prevents reflex inhibition of the respiration and the circulation.

The intra-laryngeal use is practical; the application upon the trunk is rarely so. In the deep dissection in the angle formed by the ramus of the jaw and the mastoid, slowing of the pulse and slowing or cessation of respiration is sometimes observed. This is more particularly true in difficult dissections in close fitting tumors, necessitating correspondingly greater mechanical disturbance of the superior laryngeal nerve.

In a number of cases I have had simultaneous observations made upon the respiration, the pulse, and the blood pressure. These agreed perfectly with the experimental data, viz.: the respiration and the pulse were both slowed and the blood pressure fell.

The conventional standard for judging the state of the patient is the rapidity of the pulse and its volume and tension. There is under these circumstances good opportunity for misinterpretation. As an illustration, a patient in reduced health is undergoing an extensive neck operation. The pulse may have gradually arisen to 140 or 150, and the deeper angle between the ramus of the jaw and the mastoid remains to be dissected. During its dissection the pulse may drop to 130, then to 120, then to 110 and is of good volume. Almost any anesthetizer would consider his patient improving, yet during this time the sphygmo-manometer would show that the blood pressure is falling, perhaps rapidly falling. The respiration becomes simultaneously slowed, perhaps fails.

However, after the operation is concluded and all inhibitory influences are removed the pulse becomes rapid, of small volume, and low tension.

The immediate correct interpretation of these changes is of great importance to the operator so that he may conduct the operation accordingly.

In the cases in which the operation involves a considerable amount of vagal manipulation, or its resection, it is well to inject cocain into its trunk distal to the point of severing. I have made unilateral resection of the vagus five times. It did not complicate the case more than to increase the pulse rate several beats per minute and to produce permanent hoarseness. Pneumonia did not develop.

Bilateral resection is not to be considered. In all the operations extensively involving the vagi, the tendency to

respiratory failure is marked. This is best met by alternating applications of ice and heat upon the abdomen or chest, with artificial respiration in extreme cases.

These then are the more important immediate dangers of this class of operations. Their prevention will go a long way toward controlling the most important consecutive danger—viz:—infective inflammation of the respiratory tract.

One of the principal causes of infective inflammation of the pulmonary tract is the entrance of blood in the operation. This may be wholly avoided by temporarily closing the carotid, and by posture. It also lessens the duration of the operation, which in addition to the lessening of hemorrhage leaves more vitality to resist post-operative infection. Death may be caused by toxemia alone in the cases in which a considerable amount of blood has gained entrance into the pulmonary tract.

The inhalation of infective wound discharges, if no blood has been previously inhaled, is not nearly so likely to produce an infective inflammation as in the cases in which blood has been inhaled.

If the patient is kept well upon his side and the mouth cleansed as often as any fluid appears, providing this is done by a nurse experienced in this class of cases, so as to insure against undue annoyances, the danger of infective inflammation is slight. This introduces the question as to the advisability of a preliminary tracheotomy. This operation somewhat reduces the patient, and usually causes on its own account some inflammation, occasionally fatal. It prevents the patient's assisting in cleansing his mouth as effectually as he otherwise could. It is always attended by a considerable irritation and usually some coughing. Its advantages must be very considerable to compensate for its disadvantages. In certain operations in which the uppper respiratory tract is occluded, tracheotomy is imperative.

I use preliminary tracheotomy less frequently than formerly. It gives an advantage in operations so far back in the throat that the wound is not easily accessible for cleansing, and its immediate and natural drainage is into the larynx.

In all the cases in which, by the nature of the operation,

pneumonia is probable, I have treated them as though it were sure to occur. The patient's chest is covered with a pneumonia jacket, the air of the room is moist and warm, and the patient is placed in the sitting posture early, especially in the cases of elderly subjects. If possible, he is propped up or gotten up at least part of the time from the beginning.

In the extensive mouth operations food and water should be given either per rectum or through a small tube introduced into the esophagus.

A male catheter serves this purpose very well. In the cleansing and the feeding, the use of a spray in which there is a sufficient amount of cocain to relieve the tenderness, is useful.

The final result will be permanent cure if all malignant tissue is removed.

In all cases the removal of the cervical glands in the region of possible metastases should be none the less vigorously done than in cancer of the breast.

The technique may perhaps be best given by describing an operation performed a little more than three years ago upon a patient 51 years of age, for a cancer of the floor of the mouth, involving the inner aspect of the jaw, the border of the tongue with metastases in the sub-maxillary and the deep cervical lymph glands.

Twenty minutes before the operation he was given a hypodermic injection of 1-6 of morphin, and 1-100 atropin.

The common carotid and the internal jugular vein were exposed just above the clavicle. The vein was ligated in two places and severed between. The artery was closed during the operation by means of the screw clamp. The incision was then extended upward to a point half an inch below and anterior to the angle of the jaw; from this point lateral incisions paralleling the ramus and the body were continued. The skin was then reflected sufficiently to expose the gland bearing area of accomplished or of possible infection. The sterno-mastoid muscle was found adherent to the underlying cancerous glands. It was then severed at its lower end on a level with the point of division of the internal jugular vein. Starting below, the internal jugular, the deep and the superficial fascia, the sterno-mastoid, the platysma, the submaxillary salivary

gland, all the soft parts from the deep plane of the neck behind and all the cervical glands including all the gland bearing tissue, were separated from below upward—no attention was paid to individual glands. When the jaw was reached, the part involved was resected by sawing through at two places from the outside, the tongue was split longitudinally, the corresponding side of the floor of the mouth was separated from its attachments; the entire mass including the portion of the tongue, floor of the mouth, portion of the jaw, submaxillary salivary and lymph glands, muscles, facia, metastases, deep and superficial cervical lymph glands, jugular vein and other soft parts all were removed in a block. The amount of hemorrhage was but trifling the duration of the operation short. The patient made a good recovery, and after more than three years has had no recurrence.

In summary: The principal dangers of operations for malignant disease of the mouth and neck are the immediate, the consecutive and the remote.

The immediate or operative dangers are shock and collapse. They are caused by hemorrhage, too long duration, too much manipulation, reflex and direct inhibition of the heart and of the respiration. These may be largely prevented by an absolute control of the arterial blood supply by temporarily closing the carotid artery by preliminary injection of atropin, supplemented when possible with local applications of cocain.

The principal consecutive danger is infective inflammation, particularly septic pneumonia. This is most effectively obviated by a definite control of the blood supply to avoid the entrance of blood into the pulmonary tract and shortening the operative time. In certain selected cases tracheotomy is helpful.

After the operation the greatest reliance must be placed upon warm, moist air, careful feeding, constant care of wound, posture, and special nursing until granulations appear.

The ultimate cure depends upon the stage at which the disease is attacked and the thoroughness of the operation. The removal of individual glands is clinically unsuccessful. Especial emphasis is placed upon the advantage of removing all the gland bearing tissue in which metastases may occur *en bloc*, beginning at the distal point, both because it is the point of advantage in the attack, and because thereby the avenues for dissemination are effectively closed.

LIII.

PHARYNGITIS LATERALIS HYPERTROPHICA.

By Fred Baker, M. D.,

San Diego, Cal.

Pharyngitis lateralis hypertrophica is a disease covering a very small field, but of great importance, not because inflammation of the lateral bands ever cause, any danger to life, but because it is a persistent chronic trouble, the symptoms of which are annoying enough to make life very miserable.

The literature of the subject has a curious history. From the early seventies, when Solis-Cohen gave us what was probably the first rational explanation of its pathology to the present time, its existence as a distinct pathological entity has been denied by good authorities; others have made no mention of it, or only casual ones, in their treatises, and I know of no full study covering the ground as it deserves.

Pharyngitis lateralis hypertrophica is as often described under the general term pharyngitis hypertrophica as any other, and some authors in describing the disease omit all specific mention of the lateral bands. Herein they miss the keynote to the whole condition, and this gives us the explanation of their misunderstanding of its pathology.

The tonsils are circumscribed in a really remarkable manner by the pillars of the fauces. It is indeed wonderful how often it is true that the inflammation of a severe tonsillitis does not cross these apparently arbitrary lines to any great extent. Just back of the posterior pillar on each side, and often completely hidden from view by it, is another mass of lymphoid tissue, extending in extreme cases from the level of the lowest lobe of the tonsil, up to, and around, the edge of the soft palate, the authorities say to a union with a similar mass near the mouth of the Eustachian tube, and even with the post-nasal adenoid mass when it exists. This is the lateral band proper, probably

always markedly present in young children, and undergoing with age the same degenerative changes as the other lymphoid masses of the nose and throat. Studded over the posterior aspect of the pharynx are several other detached masses of lymphoid tissue generally of small size.

Basing my opinion on my own clinical experience, I am much inclined to doubt a true connection ever existing between the lateral bands proper and the Eustachian or post-nasal tonsil. While a general inflammation of all the throat tissues is not uncommon, I have frequently seen an inflammation entirely localized in the lateral bands, and yielding so promptly to treatment directed only to them, that I believe they are as truly circumscribed as the tonsils themselves. And here is the commonest source of error in the consideration of the pathology of this disease. The lymphoid masses on the posterior median surface of the pharynx are absolutely distinct from the lateral bands, yet it has been common to describe as granular pharynx any perceptible thickening of either or both groups of tissues, thus covering two distinct pathological conditions with an extremely different chain of symptoms. Indeed the subjective symptoms of simple chronic granulations of the posterior pharyngeal wall between the lateral bands are almost absolutely nil, while inflammation of the lateral bands is often one of the most distressing conditions with which we ever have to deal.

The symptoms fall rather easily into three groups—objective, subjective catarrhal, and neurotic or reflex. Objectively we find some swelling of a portion or the whole lateral band. The trouble may be unilateral or bilateral, with much or little superficial redness. Naturally there is immense difference in the amount and distribution of lymphoid tissue in the nose and throat, and we meet all conditions from the extreme adenoid case with large tonsils, much thickening in the vault of the pharynx, the lateral bands half as thick as the little finger, and lymphoid tissue apparently peppered on everywhere where it will stick, to the adult with atrophied tonsils and no other lymphoid tissue apparent on inspection. Therefore we frequently meet cases where a determination of actual disease of the lateral bands must depend more on subjective than objective symptoms, and even cases which we must diagnose

by the results of treatment as we formerly diagnosed malaria with quinin, often a very easy procedure, and practicable within a few minutes.

The subjective catarrhal symptoms are frequently not very definite, the history of a cold and slight increase of mucous discharge from the back of the throat. In my judgment all the subjective neurotic symptoms have not yet been reported. Few portions of the body exhibit a chain of reflexes more varied, distressing or complex than the lateral bands. Some of these symptoms, more or less of which may be present in any given case are, a persistent, sharp, barking cough, hoarseness, and more particularly weakening and easy-tiring of the singing or speaking voice, an uncontrollable desire to swallow frequently, pain located at any point in the throat from the soft palate to the thyroid cartilage, though most frequently at the sides, pain on a line of points just outside the edge of the sternum, reaching as low as the seventh or eighth ribs and simulating pleurisy or pleurodynia, pain extending from the angle of the jaw into the ear, temple and mastoid, often of so severe a type as to simulate middle ear and mastoid disease, pain at the base of the tongue, pain over the scapula and extending down to the arm, and distress in breathing, very apparent to the patient, but never lessening the actual lung capacity, or ability to take a full breath.

This is a varied list, but I believe that in rare cases it may be extended to include any disturbance which can be produced by irritation of the glosso-pharyngeal and pneumogastric and some branches of the spinal accessory, hypoglossal and first three or four cervical nerves.

The extent and variety of irritation, originating as it does in what seems not to be a very sensitive spot, is remarkable, and it seems to me can only be explained along the line of pathology pointed out by Solis-Cohen. The lymphoid masses of the lateral bands surround and overlie some of the main trunks of the pharyngeal nerves and pharyngeal plexus. Congestion of these masses from cold or other causes would cause pressure. An overloading of the lymphoid tissue, or passive congestion from lowered tone of the bloodvessels would account for the

chronic character of the symptoms, and explain the results of palliative treatment.

That the reflexes are most largely pneumogastric also seems to me certain, though the other nerves often play a large part. Let us run over briefly some of the nerve distributions which show so close a connection as to bear out the correctness of this deduction, paying attention to the anastomoses and distribution to points which have been noted as seats of disturbance.

The glosso-pharyngeal or ninth nerve is a sensory nerve to the pharynx, to the lining membrane of the middle ear, to the superior laryngeal aperture, and to the basal third of the tongue. It is a motor nerve to the stylo-pharyngeus muscle. It effects communication with the otic ganglion, with the facial and pneumogastric nerves, and with the sympathetic nerve of the neck. In passing, it may be well to note its distribution to the circumvallate papillæ of the tongue, an enlargement of which produces a cough, and many other symptoms identical with the disease under consideration. The pharyngeal branches, from two to four in number, join the pharyngeal plexus.

The pneumogastric or tenth nerve furnishes sensory nerves to the larynx, and in part to the soft palate and the pharynx, inhibitory nerves to the heart and alimentary canal, sensory nerves to the middle ear, and assists in the composition of the plexuses of the pharynx, of the esophagus, and of the thorax and abdomen. It forms communication with the spinal accessory, glosso-pharyngeal, facial, hypoglossal and spinal nerves. The spinal accessory or eleventh nerve, though mostly motor, is so intimately associated with the others as to make its action probable, and its distribution is distinctly to parts affected by this disease. Small branches reach the pharynx and anastomose with laryngeal branches of the pneumogastric. It controls laryngeal phonation. The hypoglossal or twelfth nerve is the motor nerve of the tongue, and aids in depressing the hyoid bone. I have seen no case suggesting its implication in lateral band reflexes, but it anastomoses freely with the other nerves.

These nerves all anastomose more or less freely with the upper spinal nérves, which seem to be frequently active in the reflexes of these cases.

Treatment is radical and palliative. As the symptoms are almost entirely reflex, due to pressure on the pharyngeal nerves, by the congested lateral bands, the relief of this pressure is indicated. The radical treatment consists in burning away these masses by galvano-cautery or by caustic. The palliative treatment is especially the application of a strong irritant over the bands to act as a derivative, which by lessening deep congestion lessens pressure. I have had little experience with the galvano-cautery. The results have certainly been good the few times I have used it. So far as I know, all authorities who recognize the condition agree in recommending its use above all other methods, but I confess to a fear that a free burning may sometimes produce a scar, involving these sensitive pharyngeal nerve trunks. Should such a thing happen I believe the patient would be doomed to continual and incurable throat irritation of a very annoying type. I have seen one case which at least suggests such a possibility. The patient has had the lateral bands cauterized repeatedly, and has been in the hands of some of the best specialists in the world. He suffers constant pain of varying severity, and ever since hearing him tell of it I have believed that the cautery has left some such involvement of nerve trunks.

I use caustic applications, however, very freely, and with good results, so perhaps I am straining at a gnat only to swallow a camel. He who has least experience has little right to be in opposition solely on theoretical grounds.

The palliative treatment is wonderfully satisfactory. The attacks of trouble are usually due to taking cold, over-use of the voice, or indiscretions leading to gouty manifestations. The symptoms are of rather sudden access, and persist if not treated, but generally the distressing symptoms yield very promptly to one, two or three applications of an irritant, such as chromic acid solutions of varying strength, to the lateral bands, and slight care of the general regimen. If patients will report for a few applications with each attack, the condition generally gradually improves, until complete cure apparently takes place. At least, several of my patients have now gone one or more years without recurrence of the attacks. The

average aggregate of applications in these cases has not exceeded ten or fifteen, so that in ordinary cases I have chosen to depend on palliative treatment, rather than undertake radical measures which seem to be somewhat dangerous.

The symptom for which relief is most frequently sought is cough. I am much convinced that over fifty per cent. of persistent coughs from all causes are dependent on, or aggravated by inflammation of the lateral bands, elongated uvula and enlargement of the lingual papillæ. Of these the latter is rather a rare disease, leaving a large percentage to be divided, probably not far from equally between the other two.

Another common symptom of this disease is tiring of singing or speaking voice. This is commonly the condition in what is known as ministers' sore throat. It frequently yields very promptly to appropriate treatment. I recall the case of a teacher who became unable to read aloud, who was relieved entirely for six months by two applications of a twenty per cent. solution of chronic acid. After six months more trouble recurred, and two or three applications relieved her for over a year. She recently reported her throat strong and well. Such results have made me willing to forego radical treatment.

The most remarkable case of reflex from this condition which has come under my observation, I reported in the course of discussion before the Southern California Medical Society some years ago. Mrs. S. had visited my office frequently, complaining of throat pain and various reflexes. The most common complaint was of inability to breathe, though the patient could actually draw a full breath by making the effort. With this went the line of painful points down the breast, most marked on the left side. I soon found that the right lateral band, which was always apparently the more inflamed, was actually the less troublesome. This has been a common experience. It frequently seems that a superficial redness simply indicates nature's method of counter-irritation, because such an appearance often goes with little trouble. In these attacks a free application of a twenty per cent. solution of chromic acid would completely remove all distressing symptoms in from one to two minutes. The pain and dis-

tress about the chest would leave absolutely, the relief lasting from twelve hours to two days, and two or three applications always terminated the attack.

Near the end of July, 1894, this patient awoke one morning with an intensely painful spot over the left scapular spine, and a feeling that the left arm was congested and swollen. There was absolutely no objective sign of these conditions. The circulation of the left arm was normal, as indeed was that of the whole body. Three physicians saw her, and their diagnosis ranged from rheumatism to angina pectoris. No treatment had any effect, though there had been some slight relief when I saw her about August 10th, three weeks after the initial attack. The patient was spending most of her time in bed, not from the severity of the distress, but because the distress was so constant as to render sitting up very tiresome. I gave the opinion that we had some reflex disturbance to meet, but admitted my inability to locate the origin. The husband was already thinking of sending for Dr. Brainerd, of Los Angeles, and I advised his doing so. Dr. Brainerd being unable to come, I began studying the nerve connections. I found the spinal accessory supplying the trapezius muscle as a motor nerve, and connecting by origin and anastomosis with the cervical nerves of sensation over the same region, and the arm, as well as with the pneumogastric and glosso-pharyngeal. This gave me a direct enough connection to throw suspicion on the lateral bands, which had already shown some queer conditions. Without much real faith, I made two applications to the throat, as I had frequently done before. There was marked improvement after the first, and complete relief after the second. I was still sceptical until the patient came to my office about three weeks later, saying she "had waked with the same symptoms that morning, and now was the chance to demonstrate the truth of my theory." Two applications were followed by complete relief, and I am sure that such a repetition of results demonstrates that the whole chain of symptoms was caused by the swelling of the lateral bands.

In all these cases we have to deal with the neurotic subject, but curiously we rarely see marked symptoms among the young where neurotic vagaries are most startling.

Bosworth presents an explanation of this which I am inclined to accept, though he puts it forward as a theory.

During childhood, the lymphoid development is greatest but the tissues being soft, any amount of swelling does not cause much pressure on the nerves. As the retrograde changes of age come, whatever theory of the process be accepted, the masses become harder, and more tense with the shrinkage. Now any slight change in circulation or glandular activity will result in marked pressure on the nerves, and be followed by intensely distressing symptoms.

Let me conclude with the statement that though I have seen cases presenting all the symptoms here mentioned, I rarely see a new one of any severity, without unearthing some new phase of reflex. Therefore, though I may have bored you with so long a list of symptoms and cases, I feel that I have only begun a study of this protean disease.

LIV.

POLYPI OF THE ANTRUM.

By Robert C. Myles, M. D.,

NEW YORK.

I report the following four cases of antrum polypi on account of the interesting symptoms that were produced by their presence.

The first case was that of a young girl, aged 12. For a long time she had been under the care of several prominent specialists, who, by oversight or carelessness, had not detected the polyp, which was nearly three inches long. It protruded through a large round opening in the wall of the right antrum of Highmore, about where the lower posterior portion of the meatus is situated. There was little evidence of a polyp on inspection through the anterior naris. It passed along under the surface of the middle turbinal and was hidden from view by an edematous inferior turbinal.

The growth was rather slender, and had much the appearance and shape of a ginger root. It passed externally over the posterior end of the inferior turbinal close to the Eustachian tube and rested on the soft palate. The symptoms were peculiar; a full dull feeling around the right eye, a very disagreeable sensation in the rhino-pharynx, and a peculiar muffled voice. She was annoyed rather constantly with expectoration and a desire to get something out of the back of the nose and rhino-pharynx. Her throat was so irritable that posterior rhinoscopy could not be employed. After cocainizing the nose for reduction of the tissue, parts of a glistening body could be detected. A digital examination of the posterior naris detected an oblong, moderately smooth mass. The snare was passed through the nose and the tumor engaged, and then brought through the anterior naris, one and one-half inches, yet remained attached at its base. Under traction it broke close to its attachment within the antrum of Hig-

more, and as the blood subsequently came from the antrum I passed a malleable handled curette through the patulous opening and succeeded in scraping away parts of the pendulous base which was attached to the roof of the antrum. The patient made a gradual recovery and was happily relieved from all the unpleasant phenomena which had annoyed her for so long. I examined her several months after and found no recurrence, but the large opening remained.

The second case was that of a young woman, aged 32, who was sent to me by her physician on account of the distressing and unbearable pain beneath the right eye and in the temple and ethmoid region. As in the former case the inferior turbinal was rather edematous and the polyp could not be seen during the first examination. After cocain and suprarenal extract had been used, a very small portion of the polyp could be detected beneath the posterior end of the middle turbinal, and this was engaged with a snare, but it seemed to become larger as traction was made, and suddenly collapsed with a gush of at least a wine-glassful of watery fluid slightly tinged with blood. After further pulling the mass gave way, and part of the capsule of a large cyst was extracted. I present the specimen which is somewhat softened by time and the preserving fluid. A malleable handled curette was passed through as in the former case, and a quantity of broken down polyp tissue was scraped from the roof of the antrum. The eye symptoms and pain disappeared at once and the patient expressed herself as being entirely relieved. Several months afterward the pain commenced again, and I passed a curette through the large opening, which had shown no tendency to close, and scraped away quite a quantity of polypoid tissue. This seemed to destroy the growth. When I last saw her before she started for Europe, several months since, and about one year after the operation, she was free from all of the symptoms of which she previously complained.

The third case was one of a young woman, aged 21. She complained of pain in the right eye, fullness in the right side of head, and a full, heavy and unpleasant feeling in the right posterior naris. The polyp in this case could be seen on the first examination. It was snared away and was about one and one-half inches long. The

antrum was thoroughly curetted as in the last case. I watched the case for about a month and there was no evidence of a recurrrence. The hole of the antrum was large enough to admit the end of the little finger and it showed no tendency to close.

The fourth case was that of a young man, aged 21, who consulted me on December 23, 1901, having been referred by a physician. He complained of pain around the right eye and distress in the right side of the head, also oppression and difficulty in breathing through the nostril at times. He had been treated by prominent doctors in the different cities of the United States. He was a college boy, but had abandoned his studies and was on his way to Egypt in search of health and relief from his malady. This polyp which I present to you was not visible by anterior rhinoscopy, but the mirror in the throat showed the fibroid-appearing tumor above and over the right Eustachian tube. A cold wire snare was passed through the anterior naris; on traction being made the polyp reached the anterior naris before evidence of tension was made on the base. A malleable handled curette was passed through the large opening in the antrum, which had been made by as in the former case; and the base was curetted as thoroughly as possible. He expressed immediate relief from many of the symptoms, but a certain amount of pain and irritation around the eye remained. This gradually lessened up the time of his sailing, which was about one week after the operation. I have not heard from him since.

These cases present some peculiarities, for example, the hidden position assumed by the polyp on top of the inferior turbinal and beneath the middle turbinal. They were all young people and all on the right side, and two of them baffled the physicians who had charge of them for a time.

EIGHTH ANNUAL MEETING OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, HELD IN WASHINGTON, D. C., JUNE 2, 3 AND 4, 1902.

CHARLES W. RICHARDSON, M. D., WASHINGTON, PRES.

FIRST DAY, MONDAY, JUNE 2D.

The meeting was held in the Cosmos Club.

Dr. George M. Sternberg, Surgeon-General, U. S. A., delivered the

Address of Welcome.

He welcomed the Society to Washington as a center of scientific work, and to the Cosmos Club, of which he is the president, as the center of scientific work in the city. He said that he was glad that the physicians in Washington were recognized, as they should be, as true men of science.

Dr. Charles W. Richardson, of Washington, D. C., delivered the

President's Address.

He dwelt upon the university and scientific life of Washington, and the congenial surroundings for scientists. Touching upon the methods of teaching the specialties in medical schools, the opinion was expressed that the plan of compelling instruction in the special as well as in the other branches had led to undue crowding of the curriculum, and had been disappointing in its results. The instruction in the specialties, he thought, should be so planned as to supplement rather than to supplant the major branches, of which they form an integral part. Attempts to turn out full fledged specialists should be promptly checked. Theoretically, the elective system was ideal, yet the tendency in undergraduate life was toward two great narrowing by the elective system, and he thought in the long run the elective student would be overtaken and passed by those who had received a broader education. In the opinion of the speaker it was best to

develop the specialist by post-graduate teaching founded upon a broad general education in medicine.

Speaking of the condition of the Society, the President said that there were now 233 names on the roll, and that the section meetings had been better attended than in former years. A new departure has been made this year in the conduct of the annual meeting by establishing a pathologic exhibit.

Aural Bougies.

Dr. George L. Richards, of Fall River, Mass., said that a few years ago he had spoken about the use of aural bougies for the relief of earache and otitis externa. He now desired to exhibit these bougies, which he had had made. They could be done up in tin foil or dispensed in lycopodium powder. After dipping in warm water they are inserted into the external auditory canal. They are composed of morphin, atropin, cocain, carbolic acid and gelatino-glycerin. The following is the formula, which is a modification of those introduced by Gruber: Carbolic acid $^1/_{16}$ minim; fluid extract of opium, $^1/_7$ minim; cocain, $^1/_4$ grain; atropin sulph., $^1/_{14}$ grain; enough water, gelatin and glycerin to make a proper mass which will readily dissolve at the body temperature. These bougies are the size of a quill and half an inch long. In his experience, earache had been aborted by this means in considerably more than one-half of the cases occurring in children.

Dr. M. D. Lederman, of New York, presented several specimens. The first was a specimen showing

Exfoliation of the External Auditory Meatus,

occurring in a long-standing suppurating case. On removing a polypoid formation this mass had been found lying loose in the canal. After the pus was removed the discharge stopped in a comparatively short time.

A Large Fibromyxoma.

The second specimen was a large fibromyxoma which could not be removed by the snare, but required evulsion. Suppuration ceased after the removal of the growth without any secondary applications. The growth was attached to the attic, and though a large perforation of the drum existed, it healed over under antiseptic treatment.

Foreign Body Removed with Difficulty.

The third specimen was a foreign body (a pebble) for the removal of which several unsuccessful attempts had been made by others. By taking off the auricle the body was removed, and the auricle was then sutured back in place. The pebble could not be seen through the external canal, as the inner third of the canal was filled with granulation tissue which surrounded the foreign body. The probe detected a hard substance through the granulation tissue. Attempts were made to remove the stone through the canal but the pebble had formed a cavity from which it could not be dislodged. After displacing the auricle and removing the granulation tissue the stone was extracted with a dull wire curette. A large perforation in the postero-inferior quadrant existed, together with a dislocated malleus which was also removed. Under antiseptic treatment, healing of the membrane resulted in four weeks.

Dr. Sargent F. Snow, of Syracuse, N. Y., read a paper:

Points of Necessary Prominence in the Treatment of Catarrhal Deafness.

He believed that in chronic cases a good prognosis was warranted in many more cases than it is now given. The secret of success was often to be found in the relief of a constitutional condition by which the Eustachian tube is kept occluded. The best treatment was the introduction of air under pressure, saturated with gum camphor and iodin through the Eustachian tube into the middle ear, but such treatment was out of the question until patency of this tube had been secured. The modern tendency to coddling and improper personal hygiene were serious obstacles to the successful treatment of these cases. Wool and linen mesh were the best materials for the under garments. The living rooms should be well ventilated, and cold baths should be taken regularly. In the few cases in which such baths seem impracticable or undesirable, a partial substitute would be found in brisk, dry rubbing of the skin with a harsh towel. The functional activity of the liver must be maintained.

Dr. C. R. Holmes, of Cincinnati, said that he only disagreed with the author on the question of underwear. Personal experience had showed him that woolen underwear

was not the best for the catarrhal subject. Most persons lived in overheated rooms. They could not remove heavy undergarments without trouble or possible danger, while it was very easy to regulate the protection of the body by using light underwear and varying the weight of the outer clothing. He had many times taken persons, both old and young, out of flannel underwear in mid-winter, without any serious inconvenience. During the past year he had adopted the plan of printing rules and detailed instructions for regulating the living of these patients. If the patient would not in this way help the physician the local treatment would avail very little.

Dr. C. Dunbar Roy, of Atlanta, Ga., said that no fixed rules could be laid down which would be applicable to individual cases. He believed that woolen underwear should not be worn in the winter, the changes being made in the outer clothing. The nose was often operated upon when it could not relieve the condition of the ear. Because a nostril was stenosed, was no reason for believing that the deafness would be relieved after the removal of the nasal obstruction. He preferred the use of a solution of menthol and iodin in albolene to the use of vapor in the Eustachian tube. He always made use of a solid silver catheter, bent each time to adapt it to the nasopharynx of the individual case. The condition of the drum membrane as to its pliability and the existence of adhesions should be ascertained before making a prognosis. In lithemic subjects, and in those nervous persons in whom there was a determination of blood to the head on slight excitement, special treatment was required.

Dr. S. McCuen Smith, of Philadelphia, thought it was a mistake to put on heavy woolen underwear in winter, even in places as far north as Philadelphia. The general hygienic treatment outlined by the author was very useful. It had been his habit to make use of a hot shower or douche. There should be placed over the bath tub a frame made of gaspipe, and extending around the entire periphery of the bath tub at the height of six or eight feet. In this way a solid stream of hot water passes the full length of the spinal column. Hot water and cold water are used in quick alternation. By this means the person becomes less susceptible to changes in temperature. Physicians

were generally inclined to overlook the value of respiration through the skin. He had not the slightest doubt that auto-intoxication arising from fecal accumulation was often a complication in these cases, and hence he believed in flushing the colon every day for a few days, and then once a week. From two to four quarts should be used for each flushing.

Dr. Max A. Goldstein, of St. Louis, said that from the trend of the discussion so far it would appear that we were now on the eve of finding a method of curing the great bugbear, chronic catarrhal otitis media, yet he was still of the opinion that that much-to-be-desired goal is still a long way off. The hygienic treatment has been well outlined in the paper, but would not be found sufficient in many cases, and often after years of faithful and well directed treatment the discontinuance of the treatment would be quickly followed by relapse. He would like to hear the experience of the members with the local application of dry heat.

Dr. George L. Richards said that he admired Dr. Snow's enthusiasm and wished that some of his cases with chronic catarrhal deafness were so situated that they could be placed in Dr. Snow's hands. Chronic catarrhal otitis media could exist with the nose and pharynx in perfectly normal condition. One great difficulty was that the patients did not seek relief until quite late. Professor Minot had recently announced that he had discovered glands in the Eustachian tubes, a point which might explain some of the intricacies of this subject.

Dr. E. B. Dench, of New York, agreed with Dr. Holmes as to the advisability of changing the outer clothing rather than the weight of the underwear. It had always seemed to him that silk was the worst fabric for underwear, because it quickly became saturated with moisture, and the wearer was therefore exceedingly liable to be chilled upon the slightest exposure to cold. The linen mesh underwear was found to be be very comfortable and useful by many catarrhal subjects. He believed that these cases of chronic catarrhal deafness could be very materially benefited. These patients should be told at the outset that cure was probably out of the question, and that improvement could only be effected by a long course of treatment. Discouraging

as were these cases, his experience had been that, in persons who would intelligently co-operate with the physician, the results were encouraging, and even in the worst cases the deafness would increase exceedingly slowly.

Dr. William A. Ballenger, of Chicago, said that he had been almost carried away with the eloquence and logic of the reader of the paper, and while he thought the treatment must, for the most part, be that outlined in the paper, he could not entirely share Dr. Snow's enthusiasm or indorse his favorable prognosis. The reasons for failure were obvious from a study of the pathology. The disease was one in which the mucosa had been hypertrophied, and adhesive bands extended to the drum membrane or the ossicles. Moreover, the pathologic conditions in the Eustachian tube complicated the case. This tube contains considerable lymphoid tissue, which, by hypertrophy, often obstructs the Eustachian tube. Under such conditions hygienic treatment could not be expected to effect a cure.

Dr. D. J. Gibb Wishart, of Toronto, Ont., remarked that the reader of the paper had not insisted upon hygienic treatment alone, but only that it should be given its proper place.

Dr. John A. Thompson, of Cincinnati, said that the preventive treatment should receive consideration. The proper treatment of the nose and throat during the acute infectious diseases of childhood and in typhoid fever and acute articular rheumatism would accomplish much in this direction.

Dr. John O. McReynolds, of Dallas, Texas, indorsed what had been said by the previous speakers regarding underclotning, and heartily recommended the use of linen. The linen absorbs the moisture very much more rapidly than the other fabrics. The linen mesh had served him very well. It was exceedingly difficult in the South to induce ladies to take sufficient exercise because of the hot climate. About the only exercise they would indulge in was swimming.

Dr. Lewis A. Coffin, of New York, quoted a remark once made by Dr. D. B. St. John Roosa in a discussion of this kind, i. e., "Yes, gentlemen, they will all hear, but it will be when Gabriel blows his horn."

Dr. Snow said he agreed fully with those who had spoken regarding the use of thinner underwear in winter than was commonly worn. He had been wearing linen mesh for three years, but in his cold climate he found a light woolen garment necessary for two or three of the winter months. With regard to the use of vapors, he wished to say that by injecting these interruptedly the mobility of the parts seemed to be increased by the manipulation. The auscultation tube should always be used in giving the treatments. Auto-intoxication appeared to have an important connection with many, but not all, of these cases. The sclerosed cases certainly appeared hopeless, but there were a great many more which could be benefited by appropriate treatment. Even in the more intractable cases he was becoming more hopeful as a result of giving daily treatments instead of at longer intervals as formerly.

Dr. Robert Levy, of Denver, Col., read a paper entitled :

The Effect of Climate on Laryngeal Tuberculosis with Special Reference to High Altitudes.

Dr. Arthur G. Root, of Albany, said that he believed tuberculosis was the greatest social problem confronting the human race to-day, and it required a united effort on the part of the profession to solve this vital question. He knew of no locality within the United States to which every case of tuberculosis should be referred, though he knew of a number of places in this country to which certain cases should be referred. Intelligent treatment of tuberculosis would be productive of better results than could be possible attained by any climate alone. It was generally admitted that laryngeal tuberculosis might be primary in a few instances. A case of tuberculosis showing fairly advanced pulmonary lesions, and giving a history of repeated hemoptyses, should not be referred to a high altitude until this condition had improved. The dryness and purity of the air constituted the essential elements. It was safer for the person to gradually reach a high altitude so as to avoid excessive strain. Such climatic treatment combined with the other recognized methods would probably give the best results.

Dr. C. Dunbar Roy said he did not believe that tuberculosis was ever primary in the larynx. He knew of no

treatment equal to a suitable climate. Altitude was not all. Dry air was the most important desideratum. Atlanta was situated at an elevation of 1,500 feet, but in that moist climate he had seen cases of tuberculosis get steadily worse, and only improve when sent out to the dry air of Arizona. By one deep strong inhalation of a strong solution of menthol in albolene it was often possible to detect pulmonary tuberculosis in its incipiency. A cooling sensation would be experienced in the lung not involved.

Dr. H. W. Loeb, of St. Louis, said that since hearing this paper he had changed the view which he had previously held, i. e., that it was better for cases of laryngeal tuberculosis to die at home than in Colorado. He had known cases of tuberculosis which had received every kind of treatment at home without improvement, improve rapidly after going to Arizona and receiving no treatment.

Dr. John O. McReynolds said that about two years ago he had resolved not to treat any more cases of laryngeal tuberculosis because, no matter how faithfully he treated them at home, he found they did better in a more suitable climate without any treatment whatever. He had succeeded in getting the best results in an altitude of about three thousand feet on the plains of western Texas. San Antonio had an excellent reputation as a health resort for tuberculous patients, but recent statistics showed that so many such persons had flocked there that the natives were contracting this disease. Experience showed that these patients did absolutely better when away from any other tuberculous patients and with only such treatment as they could carry out themselves.

Dr. G. L. Richards said that he met with many persons afflicted with laryngeal tuberculosis who could not leave home and must be treated to the best of our ability. He had already reported ten cases which were helped and several apparently cured by simple local treatment such as the use of lactic acid and para-mono-chloro-phenol.

Dr. S. MacCuen Smith, of Philadelphia, said that in countries like Scotland, despite the moisture, the results seemed to be as good as in high and dry altitudes.

Dr. Max A. Goldstein, of St. Louis, said that he had sent many patients with incipient pulmonary and laryngeal tuberculosis to the western Divide, and they had re-

turned home with decided improvement in the laryngeal condition. He had treated three cases of laryngeal tuberculosis in St. Louis, occurring in residents of Denver, and despite the treatment they had become worse. They all improved after having been back in Denver about six months.

Dr. Sargent L. Snow said that altitude seemed to act well in a few cases because of the stimulation of the circulation and improvement in the general health. Like Dr. McReynolds, he did not give his cases of laryngeal tuberculosis local treatment, but sent them to a moderate elevation, about two thousand feet, and if they did not do well there they were sent to a higher altitude. Many of his cases had done well in the Catskill and Adirondack mountains.

Dr. M. D. Lederman commended the impartiality of the paper under discussion. He firmly believed the high altitude treatment was very promising. It was doubtful if tuberculosis was ever primary in the larynx. Outdoor treatment was most important, and extensive medication was contraindicated.

Dr. Levy, in closing, said that, of course, no one climate was suitable for all cases. As a rule, the cases developing the disease in Colorado were obliged to seek other climates for even temporary relief. The stage of the disease and the patient's financial condition must always be taken into account before sending him to some special region for climatic treatment.

Dr. D. Braden Kyle, of Philadelphia, presented

The Constitutional Manifestations Due to Infectious Processes in the Adenoid Structure of Children.

He said that this gland structure was known to be particularly susceptible to inflammation, and when this occurred there arose high fever and other constitutional manifestations in children. With the slightest infection of this gland the constitutional symptoms were entirely out of proportion to the local changes. After the removal of the adenoid structure there was very little constitutional disturbance, even though slight local infection should occur. Children having repeated attacks of fever for which no very distinct cause can be found, should be examined, as it would usually be found that adenoid hyper-

trophy was present. After recovery from an attack the adenoid structure should be removed by curetting, as this prevents the frequent recurrence of these febrile attacks and often makes the child less susceptible to the acute infectious diseases.

Dr. C. R. Holmes said that he had frequently met with these cases, and had found that they often suffered also from tubal catarrh. Sometimes the quantity of adenoid tissue had been so small that operation had not seemed necessary, yet on the removal of this small mass of tissue the tubal disorder had also disappeared.

Dr. Robert Levy said that, with the exception of West, he did not know of any one who had directed attention to this important matter. A case was mentioned occurring in his own experience in which with only a moderate adenoid hypertrophy a fever of considerable duration was quickly controlled by washing out the nose, and a cure effected by removal of this adenoid tisssue.

Dr. J. G. Wishart said that the infoldings of this gland were so deep that the absorbing surface was made very great, and the subject was worthy of considerable attention.

Dr. J. A. Stucky, of Lexington, Ky., said that until a year or two ago he had been inclined to look upon the cases described in the paper as being dependent upon irritation of the alimentary canal rather than on trouble in the nasopharynx. Very frequently the patient was relieved by a mercurial purge, but he had met more recently with a number of recurrent cases, and the removal of a small mass of adenoid hypertrophy had effectually prevented further attacks.

Dr. L. A. Coffin, of New York, referred to a case in which a child was thought to be suffering from malaria, but the usual antimalarial remedies failing to give relief, the nasopharynx was examined and pus discovered, apparently coming from the ethmoidal region. Adenoids had been previously removed from this child's nasopharynx. He was inclined to think that retention of pus at various points explained these cases.

Dr. W. B. Shields, of St. Louis, reported an illustrative case.

Dr. Dunbar Roy insisted upon the use of the post-nasal

mirror rather than the finger in the examination of the nasopharynx. Reference was made to a case in which the nasopharynx was occluded by a whitish membrane, causing great obstruction to breathing, but associated with no rise of temperature. Two cultures for the Klebs-Loeffler bacillus were negative.

Dr. C. G. Coakley, of New York, was of the opinion that inspection with the mirror often gave a very faulty idea of the amount of lymphoid tissue present when the latter was situated low down.

Dr. H. W. Loeb said that he had formerly opposed the removal of adenoids unless they occluded the tube or interfered with nasal respiration. He had under observation a child with attacks of otitis media recurring at intervals of a few weeks. There was a very small mass of adenoids, but since its removal there had been no more of these attacks.

Dr. C. E. Munger, of Waterbury, Conn., said that he had been called to see a case of diphtheria because of the great difficulty in breathing. He had removed at once a very large mass of necrosed adenoids, with the result that there had been a quick amelioration of the symptoms. This was the only time that he had operated during an attack of diphtheria.

Dr. Kyle, in closing, said that he had often made an examination for adenoids with a nasal speculum and a small electric lamp in the mouth. Only about once in one hundred and fifty times could satisfactory examination be made in a child by means of the rhinoscopic mirror. He often made use of the finger, and could determine adenoid hypertrophy with it when this was impossible by either of the other methods.

Dr. Francis R. Packard, of Philadelphia, read a paper:

Report of a Case of Rapid Necrosis of the Temporal Bone Following Scarlet Fever.*

Dr. H. W. Loeb, of St. Louis, read a paper entitled:

A Case of Fibro-Papilloma of the Larynx with Unusual Movements.

A woman of thirty-eight years was the subject of the report. The history dated back to an attack of suffoca-

*See page 505.

tion and dyspnea coming on during the night. Her voice was jerky, but there was nothing about the breathing to indicate laryngeal obstruction. Examination of the larynx showed apparently a tumor on the posterior wall of the infra-glottic portion of the larynx and trachea. As expiration began the tumor appeared, swung around and passed into the supra-glottic portion; then a second tumor appeared and surmounted the first tumor, almost completely hiding the glottis from view. During phonation, as a rule, only the first tumor succeeded in getting above the glottis. Three tumors were first removed by the forceps and a fourth one at a later sitting. It was evident that the tumors had sprung from the inferior surface of the right vocal band, and that their mobility was due to the length of the pedicle.

Dr. George L. Richards said regarding the removal of intra-laryngeal tumors under local anesthesia that if one-quarter of a grain of morphin were given about half an hour before the operation it would greatly aid the operator, as the natural reflexes would be much less marked as a result and the local anesthesia intensified.

Dr. John M. Ingersoll, of Cleveland, O., presented:

Spasmodic Torticollis Following Adenotomy.*

Dr. Thomas H. Halsted, of Syracuse, said that he had met with an exactly similar case in which the torticollis had entirely disappeared after nine days without any treatment.

Dr. William R. Lincoln, of Cleveland, Ohio, recalled a case, occurring in a young girl, upon which he had operated for adenoids. The next day the muscles of the soft palate were found to be alternately relaxing and contracting, and inquiry elicited the fact that the child had suffered from chorea some time previously.

Dr. W. B. Shields, of St. Louis, read a paper:

Influenza as a Causative Factor in Inflammatory Diseases of the Respiratory Tract.

In his experience the sinuses most frequently involved were the frontal and ethmoidal, and the affection was sometimes associated with impairment of memory and lethargy. All cases of frontal sinusitis recover without

*See page 512.

operative interference unless there is pre-existing polypoid hypertrophy or inflammation of the sinuses. The sphenoidal sinus was often affected, but recovery was usually spontaneous. The worst cases were those in which the ethmoidal cells were affected. The laryngitis of influenza was similar to that found in ordinary colds. The most distressing and dangerous cases were those in which influenza attacks the lungs, and this was particularly so in persons showing arteriosclerosis or chronic disease of the lungs. The tendency to tuberculous infection after influenza was well marked.

Dr. J. A. Stucky said that he had met with very few cases of influenza which had affected the larynx or the lower portions of the respiratory tract. He had noticed that violent frontal and occipital headache were out of all proportion to the constitutional disturbance. The nose would show perhaps only a slight swelling of the turbinate, and the temperature of the body was apt to be subnormal in the morning and rise to 100 or 101 F. later in the day. Small hemorrhagic spots were frequently found in the drum membrane of the ear. In three cases he had observed loss of smell and of memory following influenza. The majority of these cases could be relieved without surgical interference unless there had previously existed a polypoid degeneration or some other abnormal condition. Because of the prostrating effect of the disease the patient should be put to bed at once. The salicylates combined with the bromides had given him the best results in the constitutional treatment. He avoided the use of opium and of the coal tar products. To relieve the pain he used dry heat or a very weak saline solution of adrenalin, one to eight or twelve thousand. The mistake was often made of using too strong a solution, thus causing excessive reaction. The pain was due to retention of secretion.

Dr. Shields objected to the use of adrenalin in any disease of the frontal sinuses in which there was acute inflammation. He preferred a weak solution of cocain or of eucain.

Dr. Edward B. Dench, of New York, read a paper upon:

Various Operative Procedures for the Relief of Chronic Suppurative Otitis Media and Their Comparative Value.

In a consideration of the topic he confined his remarks

to those cases of long standing in which suppuration had persisted in spite of the ordinary measures for relief. In all cases the cause of the otorrhea was diseased bone within the tympanic cavity. In order to effect a permanent cure it was necessary that all diseased foci should be removed, and that any wound resulting from the surgical interference should be made to heal as quickly as possible in order that all regions previously diseased might be quickly covered with normal epithelium. In cases where the caries was confined either to the ossicles or to the ossicles and those parts of the tympanic cavity which were easily accessible through the external auditory meatus, excision of the ossicles and thorough curettement of the tympanic cavity through the external auditory canal constituted the ideal procedure, both on account of its simplicity and its safety. The author showed both from his own statistics and those of other operators that the simple operation of removal of the ossicles and thorough curettement of the tympanum effected a cure in at least one-half of the cases operated upon and he advised this procedure, provided the cases submitted to the operation were carefully selected. In every case in which this operation was undertaken the author emphasized the necessity of a thorough and complete search for the incus. The reason for this was that this ossicle was most frequently the initial seat of the intratympanic caries, and even though only a small fragment of the ossicle remained, this would be sufficient to keep up the suppuration. It should be remembered that the incus usually lies close to the margin of the tympanic ring. Occasionally it may be displaced into the lower part of the tympanic cavity by the operator in extracting the malleus. The speaker drew attention to the fact that while many operators considered the operation as finished with the removal of the ossicles, it was important to bear in mind that the operation was not complete until all diseased bone had been removed from the tympanum by the thorough use of the curette. Hemorrhage could usually be controlled by packing with sterile gauze strips or with gauze strips saturated in a sterile solution either of adrenalin chlorid or of suprarenal extract. When there was extensive caries of the middle ear it was necessary to thoroughly expose the tympanum and the adjacent

cells by the free removal of the osseous walls. When the mastoid cells were also involved, the mastoid antrum was entered as the initial step of the procedure, and the author advised this as the first step in practically every case in which the radical operation was indicated. His custom was to make the incision through the soft parts, 5-16th to 1-2 inch behind the line of the posterior auricular fold. The anterior flap was then dissected forward and the posterior margin of the bony meatus exposed. The author found that if he dissected out the fibrocartilaginous meatus from the bony canal that this membranous tube would rupture posteriorly close to the level of the drum membrane. He favored entering the mastoid antrum through the cortex rather than following the course advised by Stacke of entering the mastoid antrum through the external auditory canal, as the initial procedure. The operator was next advised to follow the upper wall of the external meatus inward and remove the floor of the tympanic vault, thus throwing the tympanic vault and the antrum into one large cavity. The next step was to break down the bridge between the opening already made in the mastoid and the external auditory meatus. This procedure involved the removal of the posterior wall of the external auditory meatus. This should be done freely, the bridge being taken away completely down to the floor of the external auditory canal, as far inward as two-thirds of the canal, that is the outer two-thirds of the posterior wall of the meatus should be removed completely and made continuous with the mastoid opening. It was considered unsafe to remove the posterior wall of the canal to this extent throughout its entire depth for fear of injuring either the facial nerve or the horizontal semicircular canal. If the bone was removed according to the plan already described the horizontal semicircular canal and the aqueductus Fallopii, lying just below it could be easily seen by the operator, and all diseased bone remaining could be removed without injury to those structures. Where the mastoid cells were pneumatic, these were to be thoroughly explored until firm bone was reached. Hemorrhage sometimes constituted an obstacle to the operation, but could always be controlled by firmly packing the cavity with gauze. In some instances the operation was prolonged on

account of persistent oozing from the bony structures, but in no case was hemorrhage so severe as to prevent the completion of the operation. The middle ear and mastoid having been thoroughly cleared out, it was next necessary to provide an epithelial lining for the extensive bony cavity thus formed. Such a continuous lining was obtained by forming flaps from the posterior wall of the fibrocartilaginous meatus and from the concha. The exact form of flap to be employed must vary with the individual case. The writer had found that in most cases it was wise not to limit these flaps to the fibrocartilaginous meatus, but to take some tissue from the concha as well in order to secure a larger amount of cutaneous covering for the exposed bone. He had also found that it was of material advantage in most cases, to dissect out the fibrocartilaginous tissue from these flaps, so that the integument might be applied more perfectly to the bony walls of the cavity. There was danger in this operation of injuring the facial nerve, the horizontal semicircular canal, the labyrinth and the lateral sinus. Any of these accidents could usually be avoided by care on the part of the operator. Comparing the results of these two operations upon the function of the organ, the writer stated that the surgeon could generally promise that the hearing would probably not be worse after the simpler operation of removal of the ossicles, but would, in the majority of cases, be improved. The effect of the radical operation upon the hearing was somewhat uncertain. In many cases it remained the same as before the operation. In a few it was made worse and in others the hearing was improved. It was, therefore, wise, prior to the performance of the radical operation, to caution the patient that the function of audition might be greatly impaired as the result of the operative procedure.

Dr. George L. Richards, of Fall River, Mass., presented his paper:

Chronic Suppurative Otitis Media—When Should Radical Surgery be Employed in Its Treatment, and of What Should This Consist?

Out of sixty-four cases of brain and cerebellar abscess he had found 82 per cent. to be the result of long standing chronic purulent otitis media. Out of nine thousand au-

topsies at Guy's Hospital, the cause of death in two-thirds of one per cent. was chronic suppurative otitis media. The small proportion, however, was no argument for shirking the duty of explaining to the patient that he was carrying around in his head what was equivalent to a charge of dynamite. According to his experience, hearing was generally improved by operation. Ossiculectomy was advised by many aurists as the first operation to be done. Distressing nausea and vertigo often followed this operation, and facial nerve paralysis, lasting several months, was sometimes observed. He therefore preferred in most instances to do the radical operation. It was essential to have good illumination for this operation, preferably that obtained from the forehead electric light. The tympanic opening of the Eustachian tube should not be overlooked in the process of curetting the cavity. Most of his patients had left the hospital in less than two weeks after the operation, and several of them in another week had returned to work. The after treatment, though simple, might last from six weeks to six months.

Dr. S. Macuen Smith, of Philadelphia, advocated the early recognition and treatment of acute suppurative disease of the ear in order to prevent many of these cases from becoming chronic. A very large percentage of these cases could be cured if proper treatment were early instituted. Early incision of the membrana tympani could do no harm, and would often arrest the process before suppuration had begun. His experience had been that in a rather large percentage of cases in which the tympanic operation had been done the radical operation would be subsequently demanded. He preferred the Stacke-Schwarze operation because of the diminished danger to important contiguous structures. The lateral sinus was certainly more forward in these chronic cases, as pointed out in Dr. Richards' paper. The effect on the hearing was of slight and secondary importance.

Dr. C. R. Holmes reported another case of facial paralysis coming on after ossiculectomy and curetting of the upper and posterior wall. Complete paralysis developed on the seventh day and disappeared in about two weeks. He had never been in favor of the Stacke operation because of the liability of wounding important structures.

A study of a great many temporal bones and taking plenty of time in operating would minimize these dangers. He had frequently exposed the dura and the lateral sinus, and did not think there was any danger in so doing. He preferred to open up and see what he was doing so as to effect a permanent cure. He believed that there should be one hundred per cent. of cures after one or more radical operations, barring intracranial complications. He was satisfied that Dr. Dench's method of using the incus hook was better than that taught him by Schwarze, and he had proved by actual experiment that by the latter method there was danger of dislocating the incus into the antrum. He preferred to do the plain Schwarze-Stacke operation, and the actual time of operation with him varied from twenty minutes to an hour and a half. If one cut freely into the cartilage one was likely to have perichondritis result with consequent shrinkage of the ear. In the majority of cases he left the wound open at first, allowing it to close in the second or third week. In young persons it could sometimes be closed at once. In the vast majority of cases the hearing had been better or not injured. Chronic suppuration even of a low grade was unquestionably deleterious to the general health, as was shown by a slight rise of temperature and a sallow complexion. The mouth of the tube should be most thoroughly, almost severely curetted. According to his experience the after treatment was very important, and it seemed impossible to train the average hospital interne in a short time to dress these wounds properly.

Dr. James F. McCaw, of Watertown, New York, asked what was the experience of the members with ossiculectomy as to the formation of a new tympanic membrane, and what had been the effect on audition. This question was prompted by personal experience. Subsequent to this new membrane formation improvement in hearing had been afforded by the use of the Valsalva method.

Immediately after the operation the hearing had been enormously augmented. The formation of the tympanic membrane had required about two years.

Dr. M. D. Lederman, of New York, said that he thought all would agree that the radical operation would be the future treatment of chronic suppurative otitis media, but

the dangers must be taken into consideration. At the last meeting of the society he had reported a case in which there had been a malposition of the lateral sinus. In using the chisel heroically one was apt to make too rapid progress. Where there was mastoid involvement there was danger of sinus thrombosis from the opening of a sinus previously healthy. He knew of three such cases; hence the necessity for the cautious removal of the diseased tissue around the sinus. He recalled a case in which reformation of the drum took place in four weeks, the case being one of long standing suppuration. At that time the patient complained of pain, and, fearing retention of secretion, the membrane was removed and also some granulation tissue found in the attic. This caused severe vertigo and vomiting, which necessitated the patient's remaining in the office for two hours. One of his cases has been compelled to stay in bed for two weeks because of severe vertigo and projectile vomiting. He would again insist upon the great importance of thoroughly curetting the tympanic orifice of the Eustachian tube.

Dr. Robert Levy asked what was the average length of time the discharge lasted after the two flap methods described; also in those instances in which the posterior wound was allowed to remain open for three or four weeks, what was the after treatment of this portion.

Dr. Dench said that the drum membrane sometimes reformed, and it seemed often to make the hearing worse. He did not think the special flap method required had any effect on the time the discharge lasted; he ordinarily expected this time to be from six weeks to two months.

Dr. G. Hudson Makuen, of Philadelphia, reported:

A Nasopharyngeal Tumor,

and exhibited the patient. He was a youth of eighteen having a tumor attached to the posterior third of the left nostril and to the vault of the pharynx. Both nostrils were practically occluded. The tumor filled the vault of the pharynx. A small section of the growth had been examined by Dr. David Riesman, who reported it to be an edematous fibromatous growth characterized by stratified epithelium. On July 7, 1901, under ether, a portion of the growth had been removed with a snare and No. 10 wire.

The tumor was very vascular and the operation was followed by considerable hemorrhage. This specimen was examined by Dr. W. M. L. Coplin and thought to be granulomatous. Nothing had been done since that time, and the patient had become apathetic in regard to it. There had not been much change in the case except the appearance of an infiltration of the muscles of the cheek. Antisyphilitic remedies had been employed without effect.

Dr. H. W. Loeb said that he did not place overmuch reliance on the diagnosis by the microscope of this class of cases. He would suggest that in this particular case electrolysis be used. He had seen marked improvement in three such cases, not only in a reduction of the vascularity but in the size of the growth, and others had reported good results. One of his cases had been kept under observation about ten years. He did not like the infiltration in the cheek, because one of his cases that proved to be malignant had acted in a similar manner; the mass proved to be an extension of the growth around the posterior surface of the superior maxilla. In one case, thought to be a fibrosarcoma with elastic fibres, the tumor grew from the vicinity of the Eustachian tube. The course of the case did not point to its being a sarcoma.

Dr. Ewing W. Day, of Pittsburg, said that he had unfortunately met with a number of such cases. One of them was a very extensive fibroma. The patient would not consent to removal of the superior maxilla, so he had made the incision as for that operation but not going under the eye. He had then cut into the maxillary antrum and cut away the inner wall of the antrum, leaving the nostril attached to the outer border of the bone. When the antrum and the nasal cavity were thus thrown into one cavity he was able to reach the root of the growth, and remove it without producing much hemorrhage. He had been surprised at the wide field of operation thus obtained. This operation had been done three years ago, and there had been no recurrence. If he had to do the operation again he would leave only a ridge to anchor the nose to, and so prevent the ballooning that now takes place in this patient when blowing the nose.

Dr. J. A. Stucky said he believed that if this infiltration of the nose were left untreated it would require an external

operation. From his own experience he felt that it was not possible to make a snare that would remove the tumor from Makuen's patient. Mention was made of an exceedingly trying case of the kind that had fallen to his own lot.

Dr. J. O. McReynolds, Dallas, Texas, advised using a cold wire snare, and holding it in position while an assistant tightened the snare as much as possible. Having made a pedicle in this way, the galvano cautery loop should be thrown around the growth. This method would allow some of these growths to be removed that would ordinarily break snare after snare. A case was cited in which the superficial layers of the growth indicated only fibroma, but examination of the deeper ones showed sarcomatous elements.

Dr. M. D. Lederman, of New York, said that he had some experience with Dr. Dawbarn's method of operating in order to starve out these growths in the rhinopharynx, and he would suggest that Dr. Makuen consider this in connection with his case. A case was referred to in which the patient had been seen five years after the Dawbarn operation and there had been at that time no return of the growth.

Dr. Edward B. Dench remarked that Dawbarn's method embraced ligation of the external carotids and their branches, with complete excision of the ligated vessels.

Dr. G. H. Makuen said that it had been impossible to get the cold wire snare around the tumor because it extended so far down on the posterior pharyngeal wall. The patient and his family would probably not consent to any other radical operation.

Dr. Max A. Goldstein, of St. Louis, read a paper:

Tuberculosis of the Middle Ear, with Report of Case.

He expressed conviction that primary tubercular infection of the middle ear was not only possible but more frequent than generally believed. In substantiation of this a case was reported in which careful physical examination showed no tuberculosis elsewhere, yet subsequently an acute miliary tuberculosis developed in the lungs and was proved to exist at autopsy. It was thought to be secondary to the tuberculous process in the ear. Altogether five cases were reported, which were believed

to be examples of primary tuberculosis of the middle ear. There was no family history of tuberculosis in these cases.

Dr. Robert Levy, of Denver, said that if we more often resorted to such microscopic examinations the literature of this class of cases would probably be extended. While not questioning the diagnosis at all he would suggest that in some cases in which tubercle bacilli were found there was the possibility of the extraneous presence of the tubercle bacilli.

Dr. E. B. Dench also expressed the opinion that this method of systematic examination if extended would probably show evidence of tuberculosis in very many more cases. This had been the experience in joint tuberculosis. The paper was certainly most instructive and suggestive.

Dr. J. O. McReynolds reported the case of a child six years old who had been brought to him some years ago with chronic disease of the middle ear. He did a radical operation and completely cured the local condition. Two years later the patient developed disease of the spine and hip joint, and died of tubercular meningitis. He looked upon this case as an example of primary tuberculosis of the middle ear. He would like to know if there was any scientific ground for the popular notion that the healing of a tubercular process in one part of the body would result in its breaking out in another part.

Dr. H. W. Loeb said that tuberculin should be used in these cases with a view to determining the presence of tuberculosis elsewhere. He did not think a reaction would be obtained from the process in the ear.

Dr. G. L. Richards asked for the experience of Dr. Levy with regard to the tuberculin test.

Dr. Levy said that in very incipient cases of tuberculosis the tuberculin had often cleared up the diagnosis, but he had never used it in connection with purely local tuberculosis.

Dr. Wm. L. Ballenger, of Chicago, said that he had had no experience with the tuberculin test in local processes, but he had observed its action in incipient tuberculosis. He mentioned two cases in which experts in physical diagnosis had found no pulmonary tuberculosis, and yet the appearance of the larynx suggested tuberculosis, and the application of the tuberculin test produced the charac-

teristic reaction. He saw no reason why tuberculosis should not be primary in the larynx and in the middle ear.

Dr. John A. Thompson, of Cincinnati, said that it was claimed that tuberculosis is always first a disease of the lymphatic glands, either of Waldeyer's ring or of the intestine, and that tuberculosis never occurs in the lungs until the lymphatics at the root of the lungs are first involved. This, he thought, would enable one to make a diagnosis of tuberculosis before there were any physical signs in the lungs. In cases of obstinate catarrhal laryngitis with an evening rise of temperature, even without physical signs, he favored making the diagnosis of incipient tuberculosis and sending the patient to a proper climate. He had known several such cases to subsequently develop pulmonary tuberculosis.

Dr. Goldstein said that the remark made by Dr. Levy simply corroborated his own view with regard to the possibility of local infection.

SECOND DAY, TUESDAY, JUNE 3D.

Dr. Joseph T. Gibb, of Philadelphia, made:

Report of a Case in which Laryngeal Symptoms Complicated Purpura Hemorrhagica.

The patient, a man of forty-two, had been well up to three weeks before admission to hospital on November 3, 1901. At that time he had been vaccinated, and ten days later the legs became swollen and a hemorrhagic rash appeared upon them. About this time there was a bloody discharge from the bowels. There were subsequent crops of hemorrhagic spots, and eventually the urine became bloody. On December 19 the speaker had first seen him because of an attack of dyspnea and crowing respiration that had existed for thirty-six hours. The entire larynx was red; the breath sounds were weak and there was marked laryngeal stenosis. On the following day after vomiting much chocolate colored mucus, the breath became nearly normal; the larynx then showed less infiltration and the surface of the mucous membrane was covered with fluid blood. An application of cocain and adrenalin gave marked but temporary relief, the hemorrhage recurring, and the patient dying next day of exhaustion. Evi-

dently the dyspnea was due to hemorrhagic edema of the submucosa of the larynx similar to the subcutaneous purpuric spots in the simple cases. The relation of the illness to the vaccination was interesting but by no means clear. The possible relation between the adrenalin and the last hemorrhage was also worthy of consideration.

Hemorrhage in Nasal Operations.

Dr. John O. McReynolds, of Dallas, Texas, instead of reading the full paper on this subject, reported one case of severe hemorrhage occurring after the use of adrenalin.

The case was that of a man of twenty-five, from whom he removed without difficulty an exostosis situated rather high in the nose. The hemorrhage occurred almost immediately after the patient leaving the office, but he did not see the man for about two hours, and then he was almost exsanguinated. The hemorrhage was controlled by packing the posterior nares.

Dr. W. Freudenthal, of New York, exhibited a device which he used for controlling hemorrhage during and after operation. It consisted of a double ice bag which is applied like a saddle over the nose, and is strapped around the head. In addition, he obtained valuable assistance from the use of stypticin internally.

Dr. J. A. Thompson thought the hemorrhage was due to the injury of one of the small arteries of the septum. Hemorrhage could be much more easily controlled by the use of cotton saturated with a styptic than by the use of gauze.

Dr. J. A. Stucky said that adrenalin should be used in the strength of one to six or eight thousand. He was accustomed to control nasal hemorrhage by the use of a little strip of dental rubber over which is placed a piece of Bernays' sponge or splint.

Dr. H. Bert Ellis, of Los Angeles, Cal., said that according to his experience hemorrhage was much less likely to occur after adrenalin alone than after the combination of adrenalin and cocain. Patients put on the chlorid of calcium prior to operation were rarely troubled with secondary hemorrhage.

Dr. M. A. Goldstein said that it was his custom to saturate the gauze with oil or melted vaseline in order to make

it impervious, and hence, suitable for controlling hemorrhage. He believed the Simpson modification of the compressed cotton splint, shaped in the form of a nasal plug, was a very satisfactory means of controlling nasal hemorrhage.

Dr. Wm. L. Ballenger, of Chicago, presented:

A Physiologic Statement of Some of the Symptoms of Mouth Breathing.*

Dr. Eugene Vansant, of Philadelphia, thought the cases in which respiratory function was abolished were very rare. In a case of severe adenoids in a child asleep there would still be found nasal respiration. If these persons were true mouth breathers there would not be much difficulty; it was because they remained nose breathers that nervous distarbances arose. There was not the slightest doubt that there was immense thickening of the epithelial lining of the pharynx and larynx, but he was disposed to doubt that such thickening extended to the air cells except in severe cases of long standing.

D. J. A. Thompson said that the interchange of gases was practically an osmosis, and it was well known that this would not take place through a dry membrane. Where nasal respiration was abnormal the pulmonary alveoli became unnaturally dry, and this was probably one of the features in the deficient osmosis and oxidation of the blood.

Dr. W. Freudenthal, of New York, said that some years ago he had made a number of experiments on this subject, and had found that children with pronounced adenoids gave off about one-ninth or one-eighth of the normal quantity of moisture. Four months after the removal of the adenoids one boy gave off about the normal amount of moisture from the nose. If the nose failed to supply the moisture to the air this would be supplied for a time by the pharynx, but the latter would soon fail also.

Dr. Ballenger, in closing, said that it was not necessary to have complete nasal construction in order to produce the pathologic conditions discussed in his paper. The point made by Dr. Thompson seemed to him very well taken.

*See page 470.

Dr. W. Freudenthal, of New York, read a paper:

Electric Light in Diseases of the Respiratory Organs.

At first he had hoped to affect the deeper tissues by the actual passage of bactericidal rays into them, but it was found that these just penetrate the epidermis and cutis. In studying the therapeutic effects of the electric light one must distinguish between the incandescent and the arc light. The author said that he had been experimenting on this line as early as 1889. He had found the arc light preferable even for the larynx. He made use of the ordinary search light, in front of which the patient sits at a distance of six or eight feet. Most of the screens suggested for removing the heat were objectionable because they absorbed in large amount certain other important rays. He used the electric light in the treatment of both laryngeal and pulmonary tuberculosis, and although he had never cured an advanced case by this means the treatment was of value just as was the use of morphin, heroin or hydrotherapy; indeed, the electric light treatment stood on the same level as hydrotherapy, but was superior to the latter because it relieved pain and facilitated expectoration. Because of the neurotic element in cases of hay asthma the results of the electric light treatment had been more conspicuous.

Dr. H. Holbrook Curtis asked the effect of direct sunlight on laryngeal phthisis.

Dr. Robert Levy said that he had never been able to satisfy himself, from the published reports, that the application of sunlight or artificial light was an important adjunct to the treatment. Equally good results, he thought, could be obtained in high altitudes where sunlight was not abundant.

Dr. Freudenthal said that he had applied sunlight and was accustomed to advise his patients to expose themselves to sunlight preferably while undressed.

Dr. Robert C. Myles, of New York, read a general paper introducing:

A Symposium on Diseases of the Accessory Sinuses.*

*See page 423.

Dr. Eugene L. Vansant, of Philadelphia, presented a paper on:

The Ethmoid Cells.*

Dr. Cornelius G. Coakley, of New York, read a paper:

The Sphenoidal Cells.

He said that the first reference he had found to this affection was in connection with an autopsy record in 1872, and Schaffer, in 1885, had been the first to detect and treat this condition in the living. Influenza or severe rhinitis were most commonly responsible for acute inflammation of these cells. There were usually fever, rigors and headache; sometimes pain referred to the back of the orbit was the only symptom complained of. Examination of the nasopharynx would usually show a thick, tenacious mucus, but it could not be seen from the sinus. The nasal mucous membrane should be kept thoroughly contracted by the frequent use of cocain and adrenalin, and the nose should be irrigated with saline solution having a temperature of about 120 F. If this treatment did not give relief some more radical measure would be demanded. In the chronic cases, examination of the anterior portion of the nose might not show any pus, but pus would usually be found issuing from the posterior nares. By means of a fairly stiff graduated copper probe he endeavored to enter the sphenoidal sinus. At the depth of 7 cm. the end of the probe would ususually reach this sinus, and on entering the sinus it could be pushed one to one and a half centimeters further. A canula is then passed into the cavity and the latter irrigated with warm sterile normal saline solution. If the fluid running out were pus-laden the diagnosis was complete. With a Bryant's gouge and curette the anterior wall below the ostium was broken down. Frequently the removal of a part or all of the middle turbinate was required before catherization and irrigation could be accomplished.

Dr. F. C. Cobb, of Boston, read a paper:

The Antrum of Highmore.

He divided cases of antral disease as follows: (1) Empyema secondary to frontal or ethmoidal disease; (2) empyema due to decayed teeth; (3) empyema due to for-

*See page 428.

eign bodies, such as rubber injected by dentists, or to eruption of teeth in or about the antrum; (4) empyema due to obstruction by new growths or polypi; (5) suppuration resulting from tumors and (6) empyema due to syphilis, and resulting in necrosis generally of some portion of the antral wall. The apparent absence of teeth did not eliminate antral disease arising from diseased roots left behind beneath the gum and often overlooked. Syphilitic empyema was usually diagnosed by the odor and softening of the bone, and its appearance in the discharge. Antral disease was often confounded with dentigerous cysts. The walls of such cysts were bony and offered the same resistance to the probe as do the walls of the antrum. If on tapping and washing out the antrum, a flow of pus occurred within an hour or two, one might be sure that it came from some source outside of the antrum. The operation of Lothrop, throwing open the antrum into the nasal cavity, was probably the best of this class of operations. Better still was the making of a wide opening into the canine fossa, leaving a flap which may be stitched up afterward, and then making an opening so as to secure drainage through the nose. In the latter a wick should be placed.

Dr. Lewis A. Coffin, of New York, presented his paper:

The Diagnosis and Treatment of Frontal Sinus Disease.

In well marked cases there would be persistent frontal headache with tenderness over the orbital region, and examination would show the nasal mucous membrane swollen and boggy, and pus probably oozing from the middle meatus. Transillumination would assist in the diagnosis. The chronic cases were not so easily recognized. In many cases an exploratory operation was necessary and justifiable to establish the diagnosis. By the use of a specially devised trephine a bone flap could be readily raised. As primary union occurred after this operation no deformity resulted. Where disease was found drainage should be established by one of several methods. He favored the drawing down of a small rubber tube through the frontonasal duct. The closed method was followed by many relapses. For exploratory purposes the opening should be made as near as possible to the median line. The explo-

ratory openings should be situated just over the inner canthus of the eye, and if necessary, the opening should be enlarged at the expense of the inferior wall. The closed method should be used only in cases in which there is obstruction of the frontal nasal duct which can be easily removed. There was no occasion for establishing drainage through the nose.

Dr. H. Holbrook Curtis, of New York, read an abstract of

The Technique of Frontal Sinus Operations—Report of Three Cases Without Nasal Drainage.

He exhibited a dressing that he had found exceedingly useful in packing these sinuses, i. e., zephyr wool deprived of its fat so as to make it absorbent. Dr. Curtis also exhibited an electric sinus lamp and a cheek retractor which he highly recommended. He particularly dwelt upon the necessity of obliteration of the sinus, and said that the fear of a deforming cicatrix was the bugbear of sinus operations. He considered that an operator should understand plastic surgery, do bold work and rely upon paraffin and his knife to obliterate the depression and the scar.

Dr. John O. Roe, of Rochester, presented a series of skulls to show the wide variations in the sinuses, thus emphasizing the necessity of modifying the method of treatment to suit the individual case. Not only were there marked variations in the location, size and direction, but in the presence of septa, and in their number. In some cases there was almost no frontal sinus, showing the danger of using a drill in opening the sinus which, under such circumstances, would pass through and injure the meninges. He had devised a curved drill run by an electric motor an instrument by means of which it was easy to enlarge the natural channel from the frontal sinus into the nose. The end of the drill was protected on one side by a shield so as to enlarge but one side of the passage and thereby avoid a subsequent closure of the passage.

Dr. James F. McCaw, of Watertown, New York, spoke of the case of a lady who had had all her teeth extracted eighteen years before coming under observation. Because of a chronic discharge and the presence of roughened bone, an incision was made along the alveolar process, and he was surprised on coming down upon a tooth lying

in a cavity of the alveolar process and parallel to it. The tooth was removed and the cavity curetted, and since then there has been no trouble.

Dr. Thomas J. Harris, of New York, said that in his hands transillumination had proved of very little value in connection with the frontal sinus. In many cases in which pus had been found at operation there had been no darkening at all on the transillumination, and in other instances when there was darkening little or no pus had been found. He agreed with Dr. Coffin that in each case one must decide whether the open or closed operation should be selected. He firmly believed that in cases in which it was not possible to find marked disease of the ethmoidal cells, the quickest and most satisfactory results would be attained by doing the open operation as described by Dr. Coffin. This operation could be done thoroughly and yet leave practically no deformity.

Dr. Sargent F. Snow, of Syracuse, said that the symposium had deeply interested him. A large majority of these frontal sinus cases would get well with better drainage into the nasal passages, not that he recommended exclusively the internal operation in all cases. Quite recently he had discovered that a number of these chronic cases had an underlying syphilitic taint, and that a thorough course solved the problem. Investigation along this line is replete with surprises.

Dr. Thomas H. Farrell, of Utica, asked for experience regarding the production of distressing symptoms by adrenalin.

Dr. R. C. Myles said that while small frontal sinuses did well under packing, large sinuses would require packing for an indefinite period, and would fill up with granulations very slowly. Some persons could be kept very comfortable by having a permanent opening in the antrum.

Dr. C. G. Coakley said that he had found the periosteum so much diseased in many cases that he doubted if gentle curettage would suffice. Many patients who had suffered for a long time from antrum disease were greatly improved by a change of air. He had tried the x-ray in cases of disease of the accessory sinuses, but in only one instance had he derived any material aid from this source except for the determination of the presence and size of a sinus.

His rule was not to irrigate except at the close of the operation. The packing was changed as infrequently as possible because each change of dressing disturbed the granulating process. By operating near the inner angle of the eye the resulting scar would be almost imperceptible.

Dr. L. A. Coffin said he could not see how Dr. Roe's drill could be made to pass down into the fronto-nasal duct. In one case in which there was pain and a shadow on transillumination, although no symptoms pointing directly to the nose, on opening the sinus an angioma was discovered.

Dr. Frank A. Miller, of New York, read:

A Study of Corditis Cantorum, or Nodes, with Special Reference to Etiology and Treatment,

and illustrated it by lantern slides and by the presentation of several patients, together with a demonstration of the exercises employed in carrying out the treatment.

Dr. James F. McCaw, of Watertown, New York, read a paper, reporting a case of:

Primary Epithelioma of the Uvula and Soft Palate, and the Treatment with the Roentgen Ray.

A screen of block tin with a cylinder of the same material served to direct the x-ray upon the desired part. The diseased surface had healed very satisfactorily under the treatment, the chief feature of the healing process being the comparative freedom from cicatricial tissue, and slight degree of contraction.

Dr. C. G. Coakley said that he had used the x-ray in a case of epithelioma of the superior maxilla, supposed to be of about three week's duration. The man refused surgical operation, and was treated by the x-ray for a week by Dr. William James Morton with some improvement. The patient then went away for a short time on business, and on his return the disease was found to have advanced very considerably.

Dr. Otto J. Stein, of Chicago, referred to a case of leukoplakia of the soft palate and mouth that he had treated for about three months by the usual method without benefit. Last December the x-ray treatment of the case had been begun by Dr. Pusey, and after two months he had reported the case as a failure. After another period of

two months the result was still negative. In Dr. McCaw's case it seemed difficult to determine how much of the good result was due to the surgical measures and how much to the x-ray.

Dr. McCaw said he believed most of the good results that would be obtained from the x-ray in this class of cases would be after incision of the growth. The result would also vary somewhat, depending upon whether a "hard" or a "soft" x-ray tube were used.

Dr. C. Dunbar Roy, of Atlanta, Ga. presented a:

Report of a Case of Laryngeal Papilloma in a Child, with Remarks.*

Dr. Wendell C. Phillips, of New York, insisted upon the great care necessary in making the diagnosis of what seemed to be benign neoplasms of the larynx because many of these proved to be malignant. In one such case occurring in his own practice, the growth proved to be an epithelioma in a very late stage. Almost any one observing this growth would have declared it to be a papilloma, yet microscopic examination showed its true nature.

Dr. Thomas J. Harris said he wished to emphasize the value, in prolonged papillomatous formations, of opening the trachea. A case was recalled in which the growths had been removed repeatedly by Dr. Nichols endolaryngeally, and in which alcohol had also been used unsuccessfully. Prolonged tracheotomy was then resorted to in order to give the part a prolonged rest. This succeeded admirably.

Dr. C. G. Coakley spoke of the similarity in structure of so-called papillomata and syphilitic growths. He was in favor of removing the papillomata in both children and adults as soon as possible. Where the base was broad they were, of course, difficult of removal. It was his habit afterward to make use of alcohol in order to postpone recurrence. Where the attachment was small one removal would often suffice.

Dr. W. B. Shields referred to the case of a physician of seventy years upon whom he had operated twice, supposing the growth to be a papilloma from its gross appearance. Microscopic examination showed it to be a sarcoma.

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*See page 482.

Dr. Roy, in closing, said that he was opposed to the method of Coakley and Phillips of removing a portion of the growth for examination, because this afforded an excellent opportunity for auto-intoxication and for the change of a benign into a malignant neoplasm. He was not in favor of removing a growth in the larynx as soon as found; it was better, in his opinion, to watch it carefully and test the effect of various medical applications.

Dr. D. J. Gibb Wishart, of Toronto, Ont., read a paper:

Abductor Paralysis of the Larynx,

reporting a case of primary adductor paralysis occurring in a person apparently suffering from tabes dorsalis and giving a history of syphilis. The cricoarytenoid articulation in this case did not seem to be responsible for the position of the cords. The patient was tracheotomized and the tube had been worn for several years with great benefit.

Resection of the recurrent laryngeal nerve was justifiable if the disease was steadily progressive. Both iodid and arsenic had been given internally. Dr. Wishart said that he had seen a second case last winter with a history of esophageal stricture in the practice of Dr. H. D. Bruce. The patient refused operation and remained under observation only a few days.

Dr. W. Haskin, of New York, made:

Report of a Case of Epithelioma of the Tympanic Cavity Involving the Mastoid.*

THIRD DAY, WEDNESDAY, JUNE 4TH.

Dr. Edward B. Dench, of New York, exhibited:

Drawings of the Venous System of the Neck.

showing the anatomic relations in a subject recently dissected, of the right and left internal jugular veins. Upon the right side the internal jugular was of small size and gave off but one branch, the common lingual and facial trunk throughout its entire extent. Almost the entire return circulation from the head and face was carried on through the left side. The external jugular and anterior jugular were very large as were also the lingual and facial

*See page 491.

veins. The thyroid and laryngeal branches were in like manner exceedingly well developed. Almost all of the return current from the head and face passed through the superficial and deep vessels of the left side. The drawings were of interest from the fact that the otologist is frequently called upon to excise the internal jugular vein for thrombosis of the lateral sinus. With a distribution of the vessels such as was shown in the plates exhibited, ligation upon the left side would have been attended with considerable difficulty, and would only have been efficacious had all of the collateral branches of the vein been secured. The plate was presented in order to bring to the attention of the society the very marked anomalies which might exist in the venous circulation in this region.

Dr. Thomas H. Farrell, of Utica, presented a

Specimen of Tubercular Larynx

obtained post-mortem from a case that he had observed at intervals of five years. The ulceration was found to encircle the larynx with the exception of a small strip on the anterior surface of the body of the cricoid. The specimen was interesting because in spite of the long period of infection the posterior commissure was not involved, and the appearance bore considerable resemblance to syphilis.

Outfit for Mastoid Cases.

Dr. Wendell C. Phillips, of New York, said that about two months ago, at the suggestion of Dr. J. F. McKernon, of New York, an outfit had been prepared by Van Horn & Co., of New York, for use in mastoid cases. This as modified by himself, was exhibited to the Society. One complete outfit was kept in stock, and could be procured on telephone order or on prescription. The outfit consisted of all necessary appliances, dressings and medicines necessary for any mastoid operation.

Dr. Phillips also presented a paper:

Pus Examination in Middle Ear Suppuration.

He said that modern practice favored the routine bacteriologic examination of all cases of suppuration of the middle ear, this examination to be made immediately after paracentesis, so as to eliminate organisms subsequently introduced from without. The micro-organisms found

their way into the middle ear through the inflamed Eustachian tube. Some of the most virulent of these organisms were frequently found in the Eustachian tube, and even as far as the antrum without any attendant morbid process. It had been demonstrated that they might even be found in the circulation without giving rise to pyemia or septicemia. From these facts it was evident that other factors, such as alterations in the resisting power of the patient and in the nature of the pabulum on which they live must be necessary to excite a morbid process. Several varieties were apt to be found in the same specimen, and hence it was the rule for the bacteriologist to state which organism predominated. Some of the organisms found in the pus from middle ear disease are: the micrococcus lanceolatus, the pneumo-bacillus of Friedlander, the streptococcus pyogenes, the staphylococcus pyogenes aureus, albus and citreus, the Klebs-Loeffler bacillus, the tubercle bacillus, the gonococcus, the bacillus of influenza and the diplococcus intracellularis meningitidis. In the examinations he had made he had been surprised at the frequency with which the last named bacillus had been present. In one of his cases the smegma bacillus had been mistaken by the first examiner for the tubercle bacillus. Many clinicians had reported that in the cases in which the pneumococcus was present complications were very apt to arise, and while this was true, his experience indicated that the staphylococcus, either alone or in combination, was the most virulent.

Dr. W. H. Haskin, of New York, said that in a case which he had had under observance he had found time and again the smegma bacillus, and had been impressed with its close resemblance to the bacillus of tuberculosis. However, it was rarely if ever found singly. The tubercle bacillus was very rarely found in middle ear disease, and he believed in many of the reported cases this error had been made of confounding the smegma bacillus and the bacillus of tuberbulosis.

Dr. E. B. Dench said that an early bacteriologic examination in an acute case proved very helpful in making a prognosis, particularly as regards mastoid complicatious and infection of the lateral sinus. They had found at the New York Eye and Ear Infirmary that in cases of

streptococcus infection there was very apt to be mastoid involvement. In these cases it was now their practice to make no effort to abort the mastoid inflammation except by incision of the drum. If the case did not promptly show signs of improvement the mastoid was at once opened.

Mention was made of a case in which the symptoms had developed in a few hours, and the examination showed a streptococcus inflammation. Only one ear was affected at first, and the other drum membrane perfectly normal, yet within two hours the membrane of the second ear became inflamed, and streptococci were found on this side also.

Dr. M. D. Lederman said that he had had examinations made in several cases of chronic suppuration, and the bacillus of meningitis had been found. The pathologist did not attach any special significance. Where there were symptoms pointing to inflammation of the bony structure in these cases it was well to operate early.

Dr. John M. Ingersoll asked what was the effect of the colon bacillus in these cases?

Dr. C. R. Holmes, of Cincinnati, said that the importance of such examinations could not be denied, yet unless such examinations were made by experts the results would be misleading. They should be made a matter of routine.

Dr. Phillips, in closing the discussion, said that if doubtful about the advisability of doing a mastoid operation, the finding of numerous streptococci should decide in favor of immediate operation. He had had almost no personal experience with colon bacillus infection in these cases.

Case Showing Deformity After Double Mastoid Operation.

Dr. C. R. Holmes, of Cincinnati, presented a lady to show the deformity left after a very extensive double mastoid operation done five years ago.

Dr. Ewing W. Day, of Pittsburg, read a paper reporting:

Two Cases of Mastoiditis, One Resulting in Thrombosis of the Cavernous Sinus, the Other Complicated with Tumor of the Cerebellum Simulating Abscess.*

Dr. W. C. Phillips said that he had followed the case

*See page 520.

reported by Dr. Berens, and remembered that at the time of the operation not one of the otologic staff of the hospital was convinced that it was an operative case. The operation was done at the request of the neurologists, and in the manner indicated by them.

Dr. Berens said that the subsequent history showed the operation to have been justifiable because the boy was entirely relieved of his pain and greatly relieved of vomiting, probably by the drainage of the cerebrospinal fluid, and his life was prolonged, probably at least two months, by the operation.

Dr. Henry J. Hartz, of Detroit, presented his paper:

The Pathology and Diagnosis of Otitis Media Insidiosa (Sclerosis).

He said that the hyperplasia began with the bone, and involved especially the articulation of the stapes and oval window. This process constitutes not only a hyperplasia, but also a hyperostosis and metaplasia, and might localize itself in any of the structures of the labyrinth and in the chain of the ossicles. When confined to the labyrinth the integrity of the acoustic nerve might be affected in a purely mechanical way, and induce Meniere's complex of symptoms. In this sclerotic process the cartilage disappeared, becoming converted into osseous tissue, and when the tip of the cochlea was involved the patency of the Eustachian tube was threatened. In most cases the membrane of the middle ear had been found thickened as a result of hyperemia, but there were few signs that the disease was the result of middle ear suppuration. Rheumatism, gout, syphilis, and scrofula, and diseases of the nasopharynx, such as adenoids and enlarged turbinates, were looked upon as predisposing causes. The duration of the process had been known to vary from three to thirty years. The diagnosis made by the exclusion of all other forms of progressive deafness and by the functional test. Statistics showed that about 10 per cent. of all middle ear diseases were examples of true sclerosis or the result of spongiose formations. There was usually a high degree of deafness in both ears, and the process began usually between the age of twenty and thirty years. Women were more often affected, and seventeen per cent. arose during the puerperium. The deafness of old age

must be excluded. Most important of all was the exclusion of catarrhal and suppurative diseases of the middle ear and tube. By the determination of the lower tone limit one could say whether the sclerosis was in the sound-conducting apparatus. Dr. Hartz exhibited Professor Bezold's continuous-tone tuning forks and demonstrated the mode of using them, also microscopic sections of the labyrinth and middle ear showing spongiose formation in the cochlea and ossicles. Some of the specimens were made by Siebenmann and Katz and Bezold.

Dr. William L. Ballenger said that this paper was the clearest exposition of the subject that he had heard. The cases had been divided into two broad classes, one involving the oval window, and the other in which the disease was chiefly confined to the labyrinth. To this might be added a third class, made up of a mixture of these two. A positive diagnosis was usually made only by microscopic and post-mortem study. The disease was not always slowly progressive, but sometimes proceeded by leaps and bounds. This was probably to be explained by the involvement of the region of the greatest functional activity, i. e., the region of the oval window. If the more remote parts of the bone were involved, then the deafness would be more insidious. He believed with Dr. Hartz that the functional tests of the ear were as important to the otologist as the ophthalmoscope to the ophthalmologist, and he was, therefore, pleased that this set of instruments had been exhibited.

Dr. C. R. Holmes said that the subject was comparatively new, and not very easy to master, although certainly a very important one as stated by the last speaker. The tests were time-consuming, but it would well repay the patient to liberally remunerate the specialist who would carefully make the differential diagnosis, and so save months of inappropriate and ineffective treatment.

Dr. Thomas J. Harris, of New York, read a paper on:

Prognosis in Chronic Catarrh of the Throat and Ear. Some Remarks by a Would-not-be Pessimist.*

Dr. Wendell C. Phillips said that he believed the author of this paper had made these pessimistic statements only

*See page 437.

to arouse opposition and excite discussion. We were all conscious of failures in certain cases. He did not think it was possible, for example, to convince any member of this society that it was desirable to abandon the use of the Eustachian catheter, even though aurists of high reputation, having lost interest in their work, have stated their belief that this instrument was almost useless. He was very glad to have the opportunity to champion the use of the catheter when intelligently applied.

Dr. C. R. Holmes said he believed in the use of the aural catheter. It was well not to promise too much in these cases. All that he would say to his patients was that he hoped to secure them as good hearing as they possessed when in their best physical condition. He was decidedly opposed to the removal of nasal spurs unless they were distinctly responsible for some pathologic condition. In some cases a turbinectomy would make the subsequent use of the aural catheter unnecessary. Much depended upon habits of life.

Dr. T. Passmore Berens said that the practice of removing turbinates wholesale was no longer popular, and more dependence was placed upon hygienic treatment.

Dr. J. A. Stucky said that at the present time he used the catheter once when formerly he used it perhaps fifty times, and he did not interfere with the spurs unless they were actually doing harm. He did, however, remove pathologic conditions of the turbinate.

Dr. Max Goldstein said that if the author of the paper had confined his criticisms to the sclerotic form most of those present would probably agree with him. One should sharply distinguish between the sclerotic and the hypertrophic form.

Dr. W. L. Ballenger said that he understood that all the author of the paper desired was that each case should be thoroughly studied and "fashions" in treatment avoided. We should not set our faces against the removal of nasal spurs because at times these operations do much good.

Dr. G. L. Richards mentioned a case in which after the removal of an obstructing nasal spur the hearing improved very much without direct treatment of the ears.

Dr. Walter A. Wells, of Washington, D. C., reported a:

Case of Thyroid Gland Tumor in the Larynx.*

Dr. M. A. Goldstein asked how the gelatin had been used in this case.

Dr. Wells replied that a 10 per cent. sterilized solution of gelatin to which had been added 1 per cent. of calcium chlorid and half of 1 per cent. of sodium chlorid was employed. It was employed on a cotton swab before and throughout the operation.

Dr. Thomas H. Halsted, of Syracuse, read a paper,

Foreign Bodies in the Larynx and Lower Respiratory Tract in Children with Report of Six Cases,

reporting six tracheotomies in children under two years and a half old for the removal of foreign bodies lodged in larynx and bronchus. Of the six cases five recovered and one died. At the time of operation dyspnea was urgent in all. In the cases reported the first spasm partially subsided after a few moments and often misled both parents and physician to believe that the foreign body had been ejected. The dyspnea recurred after a short interval and became constant with exacerbations at times. Cyanosis and epigastric recession were present in all cases and because of the nature of the foreign bodies in his cases in only one would the x-ray have been of service. In his first case a piece of shell of a pecan nut was firmly lodged in the ventricle of the larynx. In the second case it was a coffee bean which remained in the right bronchus for one week. In the third case a peanut was extracted with much difficulty from the right bronchus where it was wedged at a distance of four inches from the tracheal opening. The fourth case was somewhat similar to the third one excepting that it was coughed up to the tracheal opening after the trachea had been opened and the trachea tickled with a cotton covered probe to excite cough. The fifth case terminated fatally, death being due to pneumonia and the foreign body not found or removed, and although no autopsy could be obtained there was every reason to believe that the case was one in which a gold ring had lodged in the bronchus. No x-ray apparatus

*See page 455.

was at hand at that time. The last case reported was that of a twelve months old baby, in whom three fragments of egg shell had lodged in the larynx, remaining there for two weeks, causing great dyspnea. The consent to perform tracheotomy could not be obtained for two or three days after the diagnosis was made and then the child was in bad condition, but nevertheless the operation was successful and the child recovered. The unreliability of statistics regarding operative and let-alone treatment was well shown by the fact that the author knew of a case in which a child died of pneumonia, and the discovery of a shoe button in one of the bronchi was the first knowledge that the parents or physician had that a foreign body had passed into the air passages. It was unsafe, the author thought, to postpone opening the trachea, particularly in children, after the ordinary methods failed to remove the foreign body.

Dr. G. Hudson Makuen said that Dr. J. A. Killian had reported the removal of a fish bone 22 mm. long from the left bronchus of a child three and a half years old, under control of the eye by means of bronchoscopy without injury to the tissues, and that Dr. A. Coolidge, Jr., of Boston, had spoken of the ease with which foreign bodies may be removed from the trachea and bronchi through a straight tube placed in a previously made tracheal opening, artificial light being reflected into the tube from a head mirror, and had reported three cases in which he had employed this method with entire success.

Dr. George Fetterolf, of Philadelphia, read a paper:

A Simple Method of Correcting Deflections of the Nasal Septum.

The author emphasized the importance of recognizing the fact that redundant tissue is always present and classified the different forms thus: (1)) Deviation without thickening; (2) deviation with thickening and (3) thickening without deviation. The most difficult to correct were those embraced in the first two classes. The main difficulty that he had experienced has been in the removal of the excess of tissue. The operation should be so planned if possible, as not to disturb the muco-perichondrium. He employs general anesthesia and also applies adrenalin solution to the septum. He makes use of a

specially devised saw-file, and makes one, two or three grooves to the perichondrium on the opposite side. The antero-posterior excess can be removed along with the vertical by having the grooves cross each other. The instrument is made in three sizes so as to adapt it to the removal of varying degrees of redundancy, and with it a V-shaped cut can be readily made. A truncated form is used when the grooves already made with the sharp instrument need be widened. The tube is ordinarily not removed for five days after the operation. By the method described, preliminary section of the mucous membrane is unnecessary and the operation can be completed in three or four minutes. The two margins of the V-shaped cut are exactly parallel and thus accurate apposition and quick healing are promoted.

Dr. J. A. Stucky said that he had been deeply interested in this paper because at the meeting of the Southern Section considerable criticism had been directed against the working qualities of Dr. Kyle's saw.

Dr. William R. Lincoln, of Cleveland, said he understood this new instrument had been devised to perfect the technique of Dr. Kyle's operation. The instrument of Asch and others were generally thought to be excellent for cases not urgently requiring operation.

Dr. M. A. Goldstein said that the mechanical features of this instrument seemed to him to constitute a distinct advance beyond former methods. The instrument takes up very little room in the nasal cavity, and its cutting edges operate on both the in and out strokes of the saw. He thought that with this instrument the operation could be made submucous more easily than with any other instrument.

Dr. D. Braden Kyle said that he had employed this V-shaped operation for the correction of deformities of the nasal septum for six years. When describing this operation about three years ago he had only made a limited use of it, but in the last three years this had been the only operation that he had done. At that time he made use of a saw which, if properly made, worked satisfactorily. In cutting out the V-shaped piece two things were accomplished, viz.: (1) the cutting reduced the redundant tistue, and (2) the septum was broken up. The V-shaped

file does away with one instrument and shortens the operation materially. There was no bulging of the septum after the operation and no redundant tissue if a sufficiently large V-shaped cut were made. With the V-shaped operation, and particularly with the saw file, perforation of the septum was practically wholly guarded against. The septum must be made to swing freely from the top. Before taking out a number of V-shaped pieces it was well to dissect up a flap of mucous membrane, which is afterward allowed to fall back again. He had never seen any bad effect from even the prolonged use of his metal tube-splint. The tube should be flattened next to the septum.

Dr. Fetterolf, in answer to a question from Dr. T. H. Farrell as to why the general anesthesia was employed in this operation, said that the object was to secure complete relaxation of the patient and avoid possible fainting.

Dr. Harmon Smith, of New York, by special invitation, demonstrated his method of making

Paraffin Injections

for the correction of nasal deformities.

Dr. C. E. Munger, of Waterbury, Conn., said that he had seen some of these cases, and he thought the best result was one in which there had been both a lateral and an antero-posterior deformity. He had had only one case, and in that one twenty-five minims of the paraffin had been injected, and apparently with good result.

EASTERN SECTION OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, MEETING AT NEW YORK, MARCH 1, 1902.

Dr. C. E. Munger read a paper:

Nasopharyngeal Adenoids.*

Dr. A. E. Abrams asked if there was any difficulty in the removal.

Dr. Munger replied that there had been no difficulty whatever.

Dr. H. Holbrook Curtis remarked that he thought the subject of hemorrhage in adenoid operations was a very interesting one, for, when it did occur, it was likely to be very profuse. He would like to hear the experience of others on this topic.

Dr. C. G. Coakley, of New York, said that he had had one experience with hemorrhage after the removal of adenoids, and this one had terminated nearly fatally. The patient was a child of a physician, and the operation was done about the time of the introduction of suprarenal extract. He used this before operation. The operation was done with the aid of gas followed by ether, and the hemorrhage was only very slightly less than usual. One hour after the operation he was told that the child had vomited considerable blood, and a few minutes later a second message announced a second vomiting of blood. In about ten minutes more six or seven ounces more of blood were vomited. The child was found to be very anemic and with a pulse of 150 or more. He applied a thick paste of tannic acid, but at the time the hemorrhage had practically stopped. There was no further hemorrhage, but the quantity lost was greater than he had ever observed before or since that time. This experience had led him to prepare himself for hemorrhage as a complication of all these operations by having at hand apparatus for transfusion as well as other means for combatting undue loss of blood.

*See page 207, May number.

Dr. B. S. Booth, of Troy, N. Y., said that he had had two cases of hemorrhage following the removal of adenoids, both in adults. The hemorrhage occurred in each instance several hours after operation. Apparently the hemorrhage had ceased after the removal of the growth, and the patients had been accordingly sent home. In the course of two or three hours the hemorrhage had recurred, and had been quite brisk, so that he had been summoned. He used injections of very strong solutions of tannic acid and antipyrin, but finally he was obliged to tampon the posterior nares by means of a soft catheter introduced through the anterior nares, and provided with a loop of thread. This plugging controlled the hemorrhage, but the bleeding had lasted all night before the plugging of the nares. He had never met with profuse hemorrhage in children.

Dr. George L. Richards, of Fall River, Mass., said that so far he had fortunately not had any severe cases of hemorrhage after the removal of adenoids.

Dr. N. L. Wilson, of Elizabeth, N. J., said that he had had no experience with severe hemorrhage after this operation, but if he should meet with it he would make pressure with a cotton tampon saturated with a solution of adrenalin. He was satisfied that for half an hour or more this would control the bleeding and give an opportunity to think what else might be done.

Dr. G. L. Richards said that he was in the habit of carrying with him a bottle of full-strength solution of peroxid of hydrogen, also a tampon and a curved forceps, so that, if necessary, he could very quickly saturate the tampon with the peroxid of hydrogen.

Dr. A. E. Abrams asked whether the curette or the forceps had been used by Dr. Booth. In his opinion, there was much more danger from cutting forceps.

Dr. B. S. Booth said that in both cases he had used a dull curette. He was of the opinion that most severe cases of hemorrhage occurring under these circumstances were due to a loss of equilibrium in the vasomotor system.

Dr. George T. Ross, of Montreal, said that one of the speakers had spoken about the use of suprarenal extract. He would like to know if it was not probable that the reaction from the use of this extract might have been re-

sponsible for the hemorrhage. Good results certainly followed the use of adrenalin, but it should be borne in mind that when the first effect had passed off there was a possibility of secondary hemorrhage. As to plugging the nasopharyngeal vault, he had felt that when the hemorrhage was exceedingly profuse there was great comfort in plugging with a solution of corrosive sublimate, 1 to 5,000 or 6,000 and tannic acid. It was true that these substances were considered to be chemically incompatible, yet it seemed to him that this combination gave both the antiseptic and the astringent effect desired. He did not think in this use of the combination there was time for any injurious action from the absorption of the resulting chemical product. He had removed the plug in these cases after about six hours, and had observed no bad result. He would like to know whether any one present had had the misfortune to cut an abnormal arterial distribution.

Dr. C. G. Coakley said that he had used suprarenal powder two or three times previous to the experience already related, but it did not seem to him to do very much good, and he had in mind the possibility of secondary hemorrhage after its use. For this reason he had abandoned the use of suprarenal extract. Subsequent inquiry in the case reported showed that there was a distinct tendency in the members of this family to bleed excessively from slight wounds, and yet the case could hardly be called one of hemophilia. At the New York Eye and Ear Infirmary some of the surgeons were now using pure alcohol to swab out the nasopharynx, but he did not make use of it himself for fear of exciting inflammation about the Eustachian tubes.

Dr. H. Holbrook Curtis said that for stopping hemorrhage, either from the lungs or from other parts of the body, where there was a general oozing dependent upon arterial tension, there was nothing so good as strapping the extremities. This would reduce the arterial tension about one-half. Why this procedure was not more generally known and employed was a mystery to him. He had made use of shawl straps applied to the extremities, and had in this way promptly checked most violent pulmonary hemorrhages. As soon as one limb became cyanosed, the blood from that limb should be allowed to go back gradu-

ally into the circulation, and then the limb should be strapped up again.

Dr. G. L. Richards read a paper:

Post-Nasal Polypi,

and reported a

A Safety-Pin Case.

Dr. Carl E. Munger, of Waterbury, Conn., said that he had had a little experience recently with a safety-pin case. He exhibited a safety-pin which had been in a child's trachea for four weeks. Several general practitioners had endeavored unsuccessfully to remove it by tracheotomy. When he was called in, the child had bronchopneumonia, and was in bad condition, so any operation for the removal of the pin was deferred. Just as the child was recovering from the pneumonia it developed scarlet fever. When convalescent from the latter disease he had made an examination and had found the tip of the pin projecting through the vocal cords. Several unsuccessful attempts were made with forceps to remove it, but it was finally extracted through the old tracheotomy wound.

Dr. C. W. Richardson, of Washington, D. C., said that seven or eight years ago he had had a similar case in which the pin occluded the right bronchus, and thus gave rise to fairly clear symptoms. He removed the foreign body and reported the case.

Dr. George T. Ross, of Montreal, asked Dr. Richards regarding the manipulation employed. He stated that he thought he had dislodged the pin. Was the manipulation carried out under narcosis?

Dr. Richards replied that he had done it under chloroform anesthesia.

Dr. Ross, continuing, said that in one case he had had difficulty in making the diagnosis in a case of stenosis of the larynx in a child of three years, but had not been allowed to give an anesthetic. It was only with the greatest difficulty that he had succeeded in securing a glimpse of that child's larynx.

Dr. C. G. Coakley said that he felt whenever he had a case in an adult or a child with multiple polypi, and where these recurred after operation, that there was almost certainly diseased bone present. For this reason he was in-

clined to think that Dr. Richards' opinion that the ethmoidal cells, and probably the sphenoidal sinus, were also involved, was correct. These cells should be broken down and better drainage thus secured. A day or two after removing the polypi he would be in favor of anesthetizing the patient again and making a thorough exploration with a view to determining what cavities are involved, and then securing free drainage without waiting for further symptoms.

Dr. T. Passmore Berens said that in a case of this kind one should be on the lookout for sarcoma. He had seen several such cases, and one of the polypi just presented was certainly suspicious in appearanee.

Dr. Richards said that his experience with the safety-pin case seemed to show that if there was a metallic foreign body in the trachea, and one could secure a satisfactory x-ray picture of it, one could be sure of the situation of the foreign body. If he had another case of this kind he would operate immediately with full confidence in the results of the x-ray diagnosis.

Dr. H. H. Curtis said that he had had a case in which a kernel of corn had been sucked into the right bronchus of a child, and had been expelled six months afterward almost perfectly preserved. Shortly after the foreign body entered a pneumonia developed, but the child recovered and eventually expelled the kernel of corn during a fit of coughing coming on while he was playing with his head hanging downward.

Dr. R. C. Myles reported:

Four Cases of Polypi.*

Dr. George T. Ross asked if transillumination had been found of any utility in arriving at a diagnosis of growths in this region. This question had been frequently discussed, but many seemed to think transillumination was not of much practical value.

Dr. R. C. Myles said that he had examined all these cases thoroughly with the regulated transillumination, that is with a light of definite brilliancy. Transillumination was of no value unless a measured degree of light was employed. He used a four-candle power lamp to the

*See page 546.

Edison current with a bank of lamps of 66 candle power introduced for resistance.

Dr. B. S. Booth asked if Dr. Myles anticipated recurrence in these cases,

Dr. Myles said that one of these cases had been kept under observation for some time, and there had been no recurrence; another had had one slight recurrence; the other two were in Europe and had not been heard from.

Dr. H. L. Myers, of Norfolk, Va., said that he had had a case very much like the cystic case reported. It was not visible at all by anterior rhinoscopy, and posteriorly only a small portion could be seen. He took the case to be one of polypus underneath the inferior turbinate. He grasped it with the forceps and pulled it forward. It yielded readily, and finally burst, and then to his surprise a wine colored fluid was discharged. It proved to be a pure cyst, and evidently came from the antrum, because a considerable quantity of this fluid was discharged from the antrum when the patient held the head down. This had occurred about three months ago, and there had been so far no evidence of recurrence. The patient complained of severe pain underneath the left eye, but there was little or no difficulty of breathing.

Dr. Myles said that in all of his cases the pedicle was very small. He had unfortunately lost the specimen of the first case.

Dr. H. L. Myers reported:

A Case for Diagnosis.*

Dr. Arthur G. Root, of Albany, said that he had examined this case hastily, and was inclined to believe that it was probably a lymphadenoma. The result of the microscopic examination also seemed to bear out this view. If this diagnosis were correct, he would be disposed to give iodid of potassium and Fowler's solution internally, and then destroy the tissues as rapidly as possible with the cautery. He had seen similar cases involving the whole of the tongue, and had found the cautery better than anything else in the way of local treatment.

Dr. C. G. Coakley said that he understood two microscopic examinations had been made of the growth, and that

*See page 290, May number.

they had not thrown much light on the diagnosis They showed round cell infiltration, which would favor the view that it was a lymphadenoma. He was of the opinion that these growths were apt to develop into a malignant growth. He thought we should not be satisfied with such negative microscopic examinations. He felt sure that further microscopic examination of this growth would show lymphadenoma or possibly even lupus.

Dr. F. C. Cobb said that the microscopic examination was certainly not very satisfactory. The small round cell infiltration occurred either in connection with specific disease or with small round cell sarcoma. In at least one case it had been his lot to observe such a condition of the septum. The latter was infiltrated and the nose was blocked pretty thoroughly. A piece was subjected to microscopic examination, and the report received indicated that it was a sarcoma of the septum. While waiting for operation an ulcer appeared on the soft palate, and the diagnosis was changed to specific disease. She was rapidly cured by large doses of iodid. If the case under discussion were sarcoma it would probably have bled very profusely when touched. If this patient had not received very large doses of the iodid it should receive such treatment. He was disposed to think the case was specific.

Dr. Wendell C. Phillips thought from the history of the case that both specific disease and tuberculosis could be excluded; hence the diagnosis probably lay between lymphadenoma and lupus. His own inclination was in favor of its being lymphadenoma. He was very much obliged to Dr. Myers for bringing this interesting case such a long distance, and thought this practice should be encouraged at the meetings.

Dr. G. L. Richards said that if he had seen this case for the first time in his office he would have made a diagnosis of syphilis, but Dr. Myers thought that disease had been excluded by the treatment already employed.

Dr. Myers replied that he had given this patient only about thirty grains of iodid daily. He was treating her on the theory that the case was specific, but he had only increased the dose up to the point named so far. The medication already given had produced so little benefit

that he had become discouraged. She had also received mercury internally.

Dr. F. C. Cobb reported a case of

Peritonsillar Abscess.

Dr. George L. Richards said that he had considerable experience with peritonsillar abscess. Two recent cases had both been in the supratonsillar fossa. One of these patients was a lady physician, who complained of pain in the throat. Examination showed very little, but five days later she stated that she had been unable to swallow for two days. Examination still showed very little; therefore, under cocain he had passed a knife quite deeply into the supratonsillar fossa quite high up. Nothing was found until the knife was passed still further and entered a triangular space, when pus escaped and the patient was relieved. The important and interesting feature was that the visible swelling in the throat was very small. On the evening of the second day he had seen a young lady, who had been vaccinated some days before. As the scab began to separate and become purulent, she developed an attack of tonsillitis. The attack was very slight, and she went to work in a few days. She then became ill, and complained of soreness in the right tonsil. Examination showed nothing, but a few days later the uvula was so edematous that it filled the throat and the girl could neither swallow nor speak. He punctured it in eight places and gave relief. Two days later he passed in a knife, as in the first case, and found pus in this same triangular space. The question of the removal of the tonsil and its relation to recurrence of tonsillitis was very interesting. He thought if the tonsil was to be removed at all it should be separated from adhesions to the faucial pillars and removed thoroughly. His own practice was to remove the tonsils as thoroughly as possible, and he met with comparatively few recurrences, although occasionally he saw cases in which after thorough removal of the tonsil there was recurrent quinsy. He thought that in these cases the pus formed not in the tonsil but in the supratonsillar fossa. If these cases were excised early there would be blood discharged, but the patient would not be greatly relieved.

Dr. R. C. Myles observed that the phagocytes and the bacterial infections refuse to follow the rules laid down in the books. He had understood Dr. Cobb to say that the pus formed internal to the superior constrictor. His own observation had been that the pus was nearly always situated internally just behind the tonsil. It extended as far as the phagocytes would allow it to go. Nature's rule was to throw a larger body of phagocytes in that direction in which the danger from extension would be the greatest. The necrosis usually occurred in the direction of least resistance. These abscesses would usually extend behind the posterior wall of the tonsil anteriorily or beneath the posterior inferior border. Sometimes necrosis would occur at the base of the tonsils and would break through there. The speaker asked why the patient should have quinsy on both sides. It was easy to understand why it should occur on one side, but to have a peritonsillar abscess on one side and have it followed by a peritonsillar abscess on the other side indicated some peculiar structure in the individual case. Probably there was some pathologic condition at the base of the tonsil. He was becoming more and more convinced that from 50 to 75 per cent. could be relieved by early incision. An analysis of 50 or 100 cases would show that the patients operated upon early had the minimum amount of suffering and recovered more rapidly than when incision was delayed. The most common error was not to cut far enough outward. The abscess lies behind the tonsil, and in going through the base of the tonsil the fibrous tissue naturally closes up. If this base were avoided this would not occur. In the recurrent cases the cold abscess was one of the chief causes of recurrence.

Dr. Thomas J. Harris, of New York, said that Dr. Cobb had gone into this subject with unusual thoroughness, and he felt deeply indebted to him for this research. However, Dr. Cobb's therapeutics seemed to be somewhat at variance with that of many others. It was strange to hear the statement that the early incision had not been found beneficial. His own experience was that without exception the patient has been relieved by early incision. He would like to know whether Dr. Cobb had found no ill effects from the radical removal of the tonsil during the at-

tack. He must confess that he had never had the courage to do such radical work during the height of the attack, He would like also to know if Dr. Cobb had abandoned the classic incision at the outside of the tonsil, and now passed into the supratonsillar space, and if so, what was the advantage of this change. It was the experience, he thought, of most practitioners, that if the incision were made at the proper time, pus would be found and relief afforded by the use of the classic incision.

Dr. Carl E. Munger, of Waterbury, Conn., said that he would like to have more information on the situation of the pus. He had seen recently a case of peritonsillar abscess, in which the abscess had broken spontaneously with considerable relief to the patient. There was very little swelling to be seen, yet the patient seemed more seriously ill than one would have expected. He had not seen the case again, but had heard that the man died shortly afterward supposedly from mediastinal abscess.

Dr. A. E. Abrams asked Dr. Richards why he thought vaccination had had anything to do with the peritonsillar abscess in his case. Vaccination had been very common in this country recently, and he had heard nothing on this subject before.

Dr. George T. Ross, of Montreal, congratulated the author on the thoroughness of his paper, and called attention to a paper read before the Congress in Paris about a year ago on the same subject. The author stated that, in his experience, the supratonsillar fossa was invariably the seat of pus formation. Since reading that paper, the speaker said, he had paid some attention to this point, and when he obtained a history of recurrent attacks of tonsillitis he dissected into the supratonsillar fossa, and in the majority of cases had been pleased by obtaining a confirmation of the statement just quoted. He had usually found an excellent nidus for the propagation of pyogenic germs. He would like to have had something said about the relation of rheumatism to tonsillitis. This subject had been extensively discussed in England, and Sir Dyce Duckworth had brought forward a good deal of information on this point. The speaker said that he had had both tonsillitis and pharyngitis, and a few days thereafter an exceedingly severe attack of acute articular rheumatism.

Clinically speaking, there was no question about the relationship between these two diseases. We saw severe attacks of tonsillitis not only following but antedating rheumatism.

Dr. C. G. Coakley said that he had been very much interested in Dr. Cobb's paper. For many years he had been himself a severe sufferer from peritonsillar abscess, having two or three attacks every year between the ages of fifteen and twenty-five years. In the earlier attacks very free incisions were employed; subsequently the abscesses had not been incised, and he thought his attacks had been less severe and less frequent after having adopted the latter plan. He would admit that there were cases of peritonsillar abscess in which the pus was in a cavity of considerable size, and in these the earlier the incision was made the sooner relief was afforded. There was another type in which pus formed in a number of small foci, and in these cases if the history indicated that but little pus was evacuated by incision and the patient experienced very little relief until later spontaneous rupture of a larger collection, he would advise refraining from incision. As to the question of removing the tonsil at the time of the attack, he would say that he had tried this plan, using cocain and adrenalin, but had never been able to do a thorough tonsillectomy because of the great pain caused by such treatment. These patients were usually considerably weakened and he had not felt like persisting in such efforts. If the parts could be properly anesthetized he would admit that the tonsil could be drawn forward and efficiently treated.

Dr. W. Freudenthal, of New York, referred to the etiology of these abscesses. He thought it was very important to keep in mind the rheumatic origin, for some of these cases could certainly be prevented by antirheumatic treatment. Of course, every abscess was caused by infection, and in many cases this infection originated in the pharynx. If these parts were kept clean, especially in winter, many abscesses would be avoided.

Dr. H. Holbrook Curtis said that in a great many cases he had found marked relief from simple free incision of the tonsil, even though no pus was evacuated.

Dr. Cobb closed the discussion. As to early incision, he

said that when pus was obtained by early incision, and the pus was found about half an inch from the surface, relief would be afforded, but his experience had been that if the incision were made early and more deeply, the opening would invariably close, and that the abscess would not break through the cut made, but somewhere else. He had found that such a cut would not give relief for more than one or two hours at the most. He was aware that operating during an attack was rather cruel, but his reason for doing this was that he felt in this way he would know exactly were the pus was, whereas if he operated subsequently he might overlook the shrunken foci containing the pus. His object was to throw the whole cavity widely open, and so efficiently treat the case. The procedure was certainly very painful, but patients were willing to submit to it with the understanding that their chances of permanent relief were better. Incision through the pillar had first awakened his interest in this subject. On making incision in the customary place he had frequently found that the opening closed. He also found that the tonsil had the same relation to the pillars that an iceberg had to water, i. e., about two-thirds would be situated beneath. The pus lies in a triangular space, and if the puncture be made along the line of either the anterior or posterior pillar, the puncture would be along the line in which the pus must lie. On the other hand, by puncturing across this triangle pus might escape detection. He had satisfied his colleagues at the hospital who had believed in the old classical incision that he was right, and they had all changed to the mode of incision which he recommended. One would expect a good deal more bleeding when operating during the attack, but he thought the amount of edema present in these cases prevented much bleeding. When hemorrhage occurred, gauze could be easily packed in between the pillar and the tonsil, and the hemorrhage thus controlled. He was very much interested in the case reported by Dr. Munger. The text books state that septicemia is carried through the glands of the neck and into the mediastinum, but he thought it was more reasonable to assume that the infection passes through the pharyngeal aponeurosis, which is not very thick, and so into the pharyngomaxillary fossa, thus giving a perfectly direct road to the me-

diastinum. It was unfortunate that an autopsy had not been obtained on Dr. Munger's case. He did not think that any cut made with a knife remained open long enough to afford an outlet afterward for the pus. In the cases that he had traced the pus had discharged at some other point.

Dr. J. F. McKernon read a paper upon

Sphenoidal Abscess.*

Dr. Wendell C. Phillips, of New York, said that he desired to emphasize one point made in the conclusions of the author, i. e., the condemnation of the Wilde's incision. He believed Dr. McKernon took the proper ground on this point. There could be no doubt that if a complete mastoid operation had been done originally, abscess of the brain would not have developed. He wished to emphasize as strongly as possible the necessity for doing a complete mastoid operation at the outset, instead of doing the Wilde's incision first. He had well said that the Wilde's incision should never be mentioned at the present time, except to be condemned.

Dr. B. S. Booth read a paper:

Septum Operations.†

Dr. Edward B. Dench, of New York, said that he could see some advantage in the procedure described, but it seemed to him that in breaking up the septum by this modified Asch operation, no matter how much care was used, the patient would experience considerable shock, and it would be rather difficult to do such an operation in the office and then send the patient home. He had only done one case without an anesthetic, and in that instance he wished he had employed the method just described in the paper. The patient was an old gentleman who did not mind pain very much. The septum was broken up under cocain anesthesia. In all other cases the operation had been done at the patient's home or at the hospital, and under general anesthesia. It seemed to him that the introduction of the tube was almost as painful as the breaking up of the septum.

*See page 178, May number.

†See page 212, May number.

Dr. Thomas J. Harris, of New York, said he thought he was one of those who had criticised Dr. Booth's previous paper read before the Laryngological Section of the Academy of Medicine. This method described in the paper he had been using for a year or more, but he had never allowed the patient to go out after this operation for forty-eight to seventy-two hours. His experience had been that there had not been very much pain after coming out of the gas in the introduction of the tube, except in the case of very nervous adults or in children. This method seemed to him a very practical one, and one which would give entire freedom from pain.

Dr. George L. Richards, of Fall River, Mass., said that he used general anesthesia for these cases. He did not think it was a good plan to minimize too much the importance of surgical operations. His own practice was to do the operation at the hospital under general anesthesia, and he had entirely given up the idea of doing any operation in so many seconds. He had had very good results from putting a tampon into the nasopharynx and bringing it forward, so that there would be only bleeding anteriorly. He deprecated the idea of attempting to do most of the nose and throat operations in the physician's office and sending the patient home immediately afterward.

Dr. Stephen H. Lutz was of the opinion that the septum could be more thoroughly broken up before being cut. He had done eighteen or twenty operations in this way with good results. A paper on this subject had been presented by him at the last meeting in New York city. He was sure the septum could be more thoroughly broken before it was cut, and then any part which had not been absolutely straightened could be incised.

Dr. George T. Ross, of Montreal, asked what guarantee there was that sepsis would not occur if these operations were done in the physician's office and the patient was allowed to go home immediately afterward. He had read an article on this subject by a gentleman who claimed that sepsis occurred in this way no matter how carefully the operation had been done. A case was cited in this article in which meningitis and death had resulted from sepsis originating in this manner.

Dr. R. C. Myles said that probably 80 or 90 per cent.

of the surgical operations on the nose were done by the method now being criticised. According to his experience these patients did just about as well at their own homes as in the somewhat impure air of hospitals. He had tried various methods of operating upon the septum, but no method had yielded perfect results. He would like to know what was meant by the statement that the septum was thoroughly broken up. He had broken the septum in the cadaver, and had then examined the result carefully. He had seen patients presented in the Academy of Medicine supposed to illustrate good results after septum operation, yet the extent of nasal deformity was such that he felt anxious to operate upon them.

Dr. H. Holbrook Curtis said he thought Dr. Myles had struck the right note when he said that he had tried everybody's method and none had uniformly good results. He had found the imperfect results in Dr. Myles' cases and also in his own cases. The operator was not apt to see his imperfect results, for these patients would go away to some other operator. He had seen a great many bad results, and while the modified Asch operation, described by Dr. Booth, was good, there were others, in his opinion, that were equally good. He had often found that a simple tunnel through the inferior meatus would give good results. Often on observing such a case six months afterward it would be found remarkably improved. The rule should be to get the inferior meatus clear, and the rest would take care of itself in a great many cases.

Dr. C. W. Richardson, of Washington, D. C., said that he had watched and compared carefully the cases operated upon and retained in hospital, and those allowed to go away immediately after the operation, and he was positive that the cases operated upon under a general anesthetic and confined to bed for four or five days afterward usually displayed no fever or symptoms of sepsis, while those allowed to go free usually had some fever or presented some evidences of sepsis, and often found it necessary eventually to go to bed.

Dr. Booth said that he had not found that the patients complained very much of the pain caused by the introduction of splints into the nose. He saw no reason why the patient should stay in hospital after an operation done

under nitrous oxide gas any more than the extraction of a tooth under this form of anesthesia. It was the duty of the surgeon to do the operation as quickly as consistent with good results. It seemed to him there was nearly as much likelihood of sepsis developing in patients kept in hospital as in those sent home after the operation. There were, of course, many cases of septum deviation in which a perfect result could not be expected. If the stenosis could be reduced by such an operation a good deal would be accomplished. He tried to loosen the septum up as much as possible from the floor of the nose, and when he could feel it crack and give way he expected a good result. He had not noted any evidences of sepsis in the cases treated in his office in the manner described.

Dr. C. W. Richardson read a paper:

Keratosis of the Fauces.*

Dr. Wendell C. Phillips said that he had had considerable experience in the treatment of these cases, and he had found that a large proportion of them had been among young women. A peculiar fact in this connection was that these women were very fond of pets, such as dogs, cats and horses. Whether this had any bearing upon the etiology or not he could not say. He had never found it necessary to excise the tonsil or do any extensive operation, and he had never failed to effect a cure by galvanopuncture, frequently and thoroughly applied.

Dr. R. C. Myles said that not long since a singer had come to him with the throat, tongue and tonsil covered with white keratoid spots. These had developed rather suddenly and during a time when the patient was on an exclusively milk diet by the direction of a stomach specialist. The only thing which cured these cases was the thorough destruction of the submucosa. He had reported a case in which he had succeeded in curing all the spots except one on the tonsil. This one spot had remained for a year or more.

Dr. M. D. Lederman, of New York, referred to a very extensive mycotic condition of the fauces and tonsil discovered in a man of 35, incidentally in the course of an examination of the throat. The patient was a male. For-

*See page 187, May number.

malin had been very highly recommended in the recent literature. It was to be applied in 10 per cent. solution after cocainization.

Dr. N. L. Wilson, of Elizabeth, N. J., said that a few months ago he had tried the formalin treatment very thoroughly in a case, and as there had been but little improvement, the patient had been advised to take a sea voyage. This was done, and it was well on his return. The patient was a neurasthenic.

Dr. F. C. Cobb, of Boston, said that he had seen keratosis of the tonsil and base of the tongue, and with it even keratosis of the vocal cords and lower part of the larynx. He had never found any application which had any effect upon it.

Dr. H. H. Curtis said that he had had a good many cases of what he called mycosis of the tonsil. He recalled one case which had extended through the nasal duct to the eye, and the same condition was visible on the larynx and pharynx. He had abandoned destruction of this tissue, and now prescribed 10 per cent. pyoktanin in boric acid powder, and taught the patient to massage the parts. This dissolved the tufts most readily and relieved the patient entirely of the disagreeable sensations in the throat. He saw no necessity for destroying the glandular tissue of the throat for a mycosis that would recover in time under simple treatment. Almost every one of these patients that he had met with had been accustomed to eat raw apples, and it had occurred to him that as apples are often licked by animals this might throw some light on the etiology.

Dr. Thomas R. Pooley, of New York, said that in several instances he had observed leptothrix in the canaliculi. In these cases there was considerable fullness of both upper and lower canaliculus. These cases had been readily cured by freely slitting up the canaliculus and by curetting. Several of these cases, observed in Dr. Knapp's clinic, had been reported.

Dr. Richardson said that the sudden appearance of keratosis and its marked tendency to resolution were the chief features. To this must be added our almost total ignorance of the etiology. As he had said in his paper, he believed the best thing to do was to leave it alone if

the patient could be persuaded that this was the best course. These cases invariably recover spontaneously. The quills would recur unless the removal extended to the parts below the submucosa.

Dr. T. R. Pooley reported a case of

Epithelioma of the Auricle.*

Dr. W. Freudenthal, of New York, said that Dr. Pooley was to be congratulated upon the excellent result obtained in this case. He had presented to the Section on Otology of the Academy of Medicine a case in which quite an extensive operation had been done on the auricle. On coming to the speaker there was an eroded ulcer on the face and on the auricle, and the patient absolutely refused further operation. He did not wish to cauterize it, and hence he had applied the electric light and oxygen gas, and he must say that so far the result was very satisfactory. The patient had written to him recently, stating that he felt comparatively well, and that only a slight ulceration was left.

Dr. R. C. Myles said that a year or two ago he had presented to the Otological Society the semicircular canals and cochlea of a patient who had had epithelioma of the ear. That patient was to-day perfectly well though without hearing. He had reported a number of cases of epithelioma which had occurred in the mastoid cells. In cases of removal of epithelioma of the tongue the growth always recurred in the neck, but in cases of epithelioma of the ear the lymphatics did not seem to become infected with the disease. These cases were easily cured, and good results were obtained both by the knife and by the use of caustics.

Quite recently in a case of this kind the internal maxillary artery had been injected with paraffin to starve out the growth. He had heard from the patient to-day, and the growth was rapidly diminishing.

Dr. M. D. Lederman, of New York, said that Dr. Pooley was quite fortunate in their not having more contraction of the canal. With reference to the use of the electric light, he would say that an interesting paper had been presented in London by Dr. McIntyre, in which the statement was made that he had seen improvement in lupoid conditions

*See page 516.

from the use of the x-ray. Coming from such a source this statement was entitled to considerable weight.

Dr. Joseph F. Kenefick, of New York, said that not long ago he had heard a preliminary report by Dr. Morton, of this city, on the treatment of malignant growths by the x-ray, and the future of this treatment certainly seemed to be very promising. Judging from the results so far obtained, epitheliomata of the auricle should yield readily to x-ray treatment.

Dr. H. H. Curtis congratulated Dr. Pooley on the excellent result, and the lack of cicatrization, and expressed the opinion that in view of such results one could afford to wait patiently for further reports regarding the use of the x-ray.

Dr. Pooley said that he was at present an agnostic regarding the use of caustics. He had had a long training as a surgeon and could not reconcile himself to any of these procedures when the growths were accessible to clean surgery. It was certainly fortunate that considerable atresia of the auditory canal had not taken place. This was largely due, he thought, to the fact that the growth was very largely limited to one part of the canal and the raw surfaces were consequently not in apposition. Of course, constriction of the canal was to be feared in these cases, because of the contraction of cicatricial tissue. The growth had been examined microscopically by the pathologist of the hospital, and found to be a typical epithelioma.

Dr. W. Freudenthal read a paper:

Rhinitis Rheumatica.*

Dr. Z. L. Leonard read a paper entitled:

Chronic Hypertrophic Rhinitis.

Dr. George L. Richards, of Fall River, discussed the last paper with reference to the operation for removing a portion of the inferior turbinate. When the hypertrophy was considerable, he said, the only method which absolutely relieved the patient was the removal of a portion of the inferior turbinate. He was sorry that the author had not described his operation more in detail. Dr. C. R. Holmes, of Cincinnati, at the meeting of the American Medical Association at Columbus, O., described a method of sawing

*See page 167, May number.

diagonally from the under side upward toward the middle line against the septum. The saw was used at first, and the operation completed with scissors. In the healing the major portion of the mucous membrane and spongy portion of the turbinal was preserved, and when the healing process was completed the turbinate looked almost normal. Dr. Griffin, in a paper published last year, had described a very similar operation. The results were certainly excellent, but the inferior turbinal would bleed, although not at the time of the operation. He formerly made use of gauze to control the bleeding, but at the suggestion of Dr. Griffin he had used pledgets of cotton which were more easily removed at the end of forty-eight hours. The cotton was wrapped up firmly into a pledget, dipped in full strength solution of peroxid of hydrogen and an antiseptic oil, and then pushed up against the cut.

Dr. Carl E. Munger, of Waterbury, Conn., took exception to the statement made in the last paper, to the effect that preference should be given to operations on the turbinal rather than upon the septum. It seemed to him that the septum or the turbinal should be treated depending upon which one seemed to be the source of the trouble. As little as possible of either should be sacrificed.

Dr. M. D. Lederman remarked that punk would not adhere to the wound as did cotton and gauze.

Dr. Conrad Berens, of Philadelphia, said that there was a true hypertrophy of the inferior turbinal bone, and also a hypertrophy of the mucous membrane overlying the same. When there was not true hypertrophy of the inferior turbinal, orthochlorophenol, as recommended some years ago by a Russian physician, would be found a most satisfactory application. A pledget of cotton wrapped tightly on a probe was dipped in this agent and applied after having cocainized the part. The application should be literally massaged into the part. The immediate result was an enormous swelling followed by the exfoliation of a gelatinous mass, and subsequently by a practically permanent contraction.

Dr. H. H. Curtis asked if the application of the orthoclorophenol was as efficient as chromic acid.

Dr. Berens said that, under the instruction of the late Dr. Harrison Allen, he had been taught to use the chro-

mic acid bead, and he had followed those instructions most faithfully, but orthochlorophenol was far superior to it.

Dr. R. C. Myles suggested that the cases should be better classified. Many patients suffer from a mixed condition, a base of hypertrophy with the addition of an intumescence. He had noticed the pendulum's swing from the removal of the entire turbinal to the slightest cauterization, and he believed it was a question of the proper selection of cases. If trichloracetic acid were applied to the milder forms of hypertrophy it would give temporary benefit; monochloracetic acid would act more deeply, and chromic acid would act still more deeply. He had found that the electro-cautery used with an extremely small tip, passed slowly from the back to the front and straight through the tissue, followed by monochloracetic acid applied carefully so as to substitute the eschar of this acid for the electrocautery eschar, would usually give the best results. If the turbinate were very abundant, he sometimes used the cold snare if he feared hemorrhage, but he preferred the use of the scissors.

Dr. Francis J. Quinlan, of New York, expressed surprise that no allusion had been made to the presence of lymphoid hypertrophies even in adults. Sometimes these remained even to advanced age. Sometimes these vasomotor hypertrophies were known to cause a great deal of annoyance. In more than one instance had he cauterized the inferior turbinal, and yet in a month or two the patient had returned with a large amount of redundant tissue. Latterly he had found that going into the vault with his finger he had encountered little nodules that had interfered with the return of the blood. After the removal from the vault of fifteen or twenty drops of blood he had at times been amazed at the reduction of the tips. This simple measure of depleting the pharyngeal vault would enable us to overcome the slight hypertrophies of the turbinal.

Dr. F. C. Cobb endorsed what had been said by the last speaker. He recalled the case of a young woman who had such enormous hypertrophy that neither the cautery nor anything else had any effect. After removal of the adenoids from this patient he had watched her for two

years, and during this time he had found no swelling of the turbinates, although this had existed for at least a year previously.

Dr. Corwin endorsed the statement that had just been made by the two preceding speakers as to the effect of removing adenoid tissue in the vault upon the circulation in the anterior part of the nose. With regard to the hemorrhage following excision of portions of the inferior turbinal, especially the anterior part, he would say that in all the operative procedures of the nose he had obtained better results from avoiding the introduction of any packing whatever. He insufflated on the operative field some powder, usually nosophen, and carefully instructed the patient with regard to what regimen should be followed for the first twenty-four hours. The patient was told to avoid anything which would tend to make the face red. If bleeding occurred, he was instructed not to assume the recumbent position, but to avoid all sources of mental excitement, as well as the drinking of warm fluids or sitting near the fire. Occasionally he gave the patient a solution of adrenalin to use cautiously, but ordinarily it was not necessary even after a most extensive operation.

Dr. H. H. Curtis said with regard to the paper on rhinitis rheumatica, that he was glad that this subject had been brought up again because he thought specialists were prone to neglect constitutional conditions. He recalled various cases of his own that might perhaps have been better treated by a proper consideration of this subject.

Dr. Z. L. Leonard said, in closing the discussion, that one of the points alluded to in his paper was the matter which had been brought out more in detail by Dr. Freudenthal's paper, and which seemed to have been lost sight of in the general discussion, i. e., the rheumatic or gouty diathesis behind many of these cases. It was taken for granted by him that before any surgical interference was attempted upon a hypertrophied turbinal that the vault was thoroughly clean. The time was when after an operation on the middle or inferior turbinal body it was packed as firmly as possible with long strips of gauze, and in those days the physician was frequently called up at night because of hemorrhage; but since adopting the plan of clearing away all the small portions of stringy material left

after operation, using preferably Holmes' scissors, and applying adrenalin on a small pledget of cotton, there had been little trouble. The patient should be put to bed and kept perfectly quiet, and cold applications applied to the nose externally. There might be some bleeding at the first change of dressing, but that was usually very trivial if peroxid or hydrogen were used to soften up any adhesions that may have formed. He had no intention of bringing out any new thing, but rather to recapitulate the best methods of treatment.

Dr. A. B. Duel reported a case of

Laryngeal Stenosis Following Intubation.

Dr. N. L. Wilson asked if Dr. Duel had had any experience with the tube falling down into the trachea after splitting the larynx.

Dr. Root said that he had been deeply interested in the paper of Dr. Duel. He had himself had a large experience with intubation, and he could endorse the views expressed in the paper. He recalled a recent case of stenosis occurring in a woman in whom he had done a tracheotomy first to allow the patient to get used to the tube. Later on the cicatricial tissue could be dissected out. He was greatly indebted to Dr. Duel for the suggestion that the tube should be retained for a long time. Intralaryngeal stenosis whether due to croup, diphtheritic infection or chronic in its nature, also caused the physician great anxiety. He thought most of the tracheotomies should be done under cocain anesthesia. Such operations could be done without causing pain and could be performed better than under general anesthesia.

Dr. Duel said the retaining tube was put in primarily to avoid the constant auto-extubations which made reintubation frequently necessary. The great point was to leave the tube absolutely undisturbed for a number of weeks. In a case in which he did a thyrotomy, because after placing in a tube which fitted the trachea it was constantly coughed out, he would be inclined to place around the tube something much smaller than the present retaining device in order that it could be readily pulled out. Possibly two or three strands of silk would suffice for this purpose.

Dr. Cobb asked if there was not an intubation tube made with a little tube screwing into the other tube.

Dr. Duel said that he had heard that such a tube was made, but the instrument maker told him that it was impossible to make a tube in this way and have it securely fasten. A metal tube could not be left in for the desired length of time without a good deal of corrosion and clogging being produced.

Dr. T. J. Harris read a paper:

Temperature After Mastoid Operations.*

Dr. N. L. Wilson expressed his personal thanks to Dr. Harris for this paper, because it was a subject which had caused him some uneasiness. In talking with colleagues who were in the habit of doing appendicitis operations, he had learned that it was not unusual to observe the same thing after these operations, although the patients did perfectly well.

Dr. C. G. Coakley said that he had a case which had given him a good deal of worry. A child had had measles in November, and in December had developed mastoid disease. Two or three days after the operation the child had a temperature of 102° F. for a day or two. It then dropped to normal for two or three weeks, and again ran up to 101° or 102.° The wound healed up entirely, yet at the present time the child was still running a rectal temperature of 99° or 100° F. Sometimes the temperature would be higher in the morning; at other times it would be higher in the afternoon. No malarial plasmodium had been found in the blood.

Dr. G. B. McAuliffe, of New York, said that he had come to the conclusion that every case having an elevation of temperature after operation was septic. It was formerly the practice to call this traumatic fever, and it was supposed to be in proportion to the amount of tissue injured.

Inquiry had shown that if thorough asepsis had been secured, and all diseased tissue removed, the fever would subside. He recalled a case in which a surgeon had done a most extensive mastoid operation, and the temperature remained normal, showing that fever did not occur after operation as a result of the extent of tissue attacked.

*See page 286, May number.

Many surgeons were content to secure drainage, and would leave many pockets improperly cleaned out. He had seen children of two or three months in whom there had been no elevation of temperature after mastoid operation, although many surgeons claimed that fever almost always occurred in these young subjects after such operations.

Dr. Harris said he felt sure that Dr. McAuliffe could not be right in this matter because the cases that he had studied had been under the charge of many different operators, and he was familiar with their work. He was sure that these men were accustomed to do very thorough aseptic work, and yet only one out of one hundred cases showed an afebrile temperature after the operation.

Dr. H. N. Hoople read a paper upon

Empyema of the Antrum

of which the following is the author's abstract:

The air cavities of the bones of the face have some important function to perform aside from incidentally contributing to the lightness of structure of the bones enclosing them. This function is doubtless connected with their form and relation to each other and to the nasal chambers. The frontal, ethmoidal and maxillary sinuses are so placed as to have a common opening into the hiatus semilunaris situated about the very middle of the nasal breathway—practically three flasks with one common mouth over which the wind plays. The effect of this mechanical arrangement is to utilize the principle upon which an atomizer works, viz., that of the Sprengle air pump, the effect of which is to increase evaporation from the air cavities and thus cause abstraction of heat from their circumjacent tissues to effect a process of cooling which contributes to their comfort.

The result of impaired function in these same cavities would be reduced comfort. Were they absolutely closed cavities, from accident or pathologic causes, they would become water-logged, so to speak, and create ache and discomfort in the surrounding tissues. Clinically the constant testimony of those who have a cold in the head, an influenza, or a sinusitis of one or more of these air chambers, or other pathologic condition of their nerve and blood supply, is that a sense of fulness exists in and

around the face and forehead, the head feels compressed and heavy, the faculties are dull and irresponsive, the memory fails, concentration is impaired and altogether an indefinable sense of ill-being exists which the patient is seldom able to express satisfactorily to himself or to the physician. This lurking and obscure sense of great discomfort is one of the characteristics of this disease which I mentioned first and place in highest relief in treating of its pathology, thereby indicating that there is one certain and pathognomonic symptom of empyema of these sinuses except it be this ill-defined but positive and distressing disturbance of the nervous system.

The poverty of the blood supply to the thin lining of these air cavities explains the relative paucity of granulations found when chronicity of inflammatory process is considered and also the rarity of some hemorrhage in these cases. Yet Scheppegrell, in 1894, met with a case of such severe hemorrhage from the antrum that it had to be kept packed for four weeks to avoid fatal issue. He supposed an angiomatous condition of the mucous membrane. Lücke gives a case in a man of twenty-six years in whom bleeding characteristic of a vascular tumor occurred requiring packing. After a chiseling operation hemorrhage was so profuse that transfusion was done to save the patient.

I have elsewhere described a case in which alarming hemorrhage took place. It was a case of double ptosis with diplopia in one having almost normal respiration but vision reduced to $^{4}/_{10}$ with each eye. Nasal faults were corrected. The third operative step freed the left middle turbinate from adhesion to outer wall of the middle meatus and crushed its bulbous anterior end. Three days after that his remaining photophobia had gone, his diplopia had greatly lessened and his ptosis was appreciably less. Twelve days subsequently his vision was $^{6}/_{10}$ with each eye and the ocular muscle tests were greatly improved. Five days after that, i. e., three weeks after freeing the anterior end of the left middle turbinate, he had profuse bleeding and free flow of yellow pus from the left nostril. There had been no pus flow before this. It was foul-smelling. Enough of the left middle turbinate was removed to give free access to the ethmoid cells and maxillary sinus. A

tampon of cotton dipped in carbolic solution was retained two days. Its removal was followed by hemorrhage and flow of yellow pus. The left molar bone and the last upper left molar teeth were tender now for the first time. Throbbing of the temple and tenderness of the scalp were also complained of. With the second tampon *in situ* a second hemorrhage occurred two days later. A further and more severe and blanching hemorrhage followed the same night, after which pus discharge alone continued for some weeks, when all diplopia and other eye-symptoms were completely gone, the vision being restored to $^{8}/_{10}$ with each eye which subsequently went on improving to $^{10}/_{10}$. This rapid evolution of a suppurative condition was regarded at the time of its being reported as having been lacking in definitive characteristics of antrum involvement, one instancing the non-employment of transillumination and another invoking the *argumentum ad personem*, he never having seen a chronic empyema get well without radical opening. Another claimed the frontal or the ethmoidal sinus must have been the one involved.

The author cites Jonathan Wright's estimate of transillumination—wholly untrustworthy for diagnosis—points out the unjustifiability of exploratory puncture in a case which was getting well without it, and reminds his critics of recoveries instanced in both acute and chronic cases.

A summary of the literature is given covering the views as to pathology and etiology.

Dr. J. C. Lester read a paper entitled:

Extrinsic Nasal Neoplasm.*

Dr. Lester also exhibited a patient with an epithelioma of the orbit of eighteen year's standing. The growth was first considered to be lupus, but the pathologist had recently reported it to be epithelioma. The patient stated that the growth had nearly disappeared at one time under the use of the x-ray. The case was presented because he intended to subject it to x-ray treatment.

Dr. C. Berens read a paper:

Empyema of Frontal Sinus.

Dr. C. G. Coakley said that he had listened attentively to the paper of Dr. Hoople, but had failed to learn that

*See page 200, May number.

a positive diagnosis of antral disease had been made in that case. There had been no transillumination although there had been some pain in the region of the antrum. The antrum had not been washed out to make certain that it was not involved. It had occurred to him that the ethmoid cells or the frontal sinus, or possibly even the sphenoidal sinus might have been the part involved instead of the antrum. When there was a very extensive change in the mucosa of the antrum recovery was not apt to occur so easily as in the case reported.

With regard to the second paper, he would say that he heartily agreed with the author's conclusions regarding the advisability of early and thorough operation in cases of frontal sinusitis.

Dr. A. G. Root, of Albany, said that in his brief experience he had never seen a case of granuloma either completely or partially filling the antrum, and causing considerable pus formation and hemorrhage, that had ever recovered without a free opening into the antrum and cleaning it out. If such a procedure were indicated, no intranasal operation, in his judgment, would suffice. The procedure was to open into the antrum after raising the cheek. The finger should be introduced and the cavity explored. Through and through drainage should be secured, if necessary by the removal of the tooth. If there was a growth present which gave rise to pus and hemorrhage, there was reason to believe that it was malignant, and not a granuloma. If the growth were malignant, then the operation indicated was its removal.

Dr. F. C. Cobb said that the antrum was often filled with pus without there being any cause for it in the antrum itself. If the ethmoidal cells were opened, the antrum need not be itself opened. Some of the cases cited might have been examples of affection of the ethmoid, the antrum simply serving as a reservoir for the discharge from the upper sinuses.

Dr. Francis J. Quinlan said that he had demonstrated before the Laryngological Section of the Academy of Medicine a radical operation that he had devised, i. e., the removal of the anterior wall. These cases of empyema of the frontal sinus should be treated radically like the mastoid. It was no more serious to dissect back the peri-

osteum and the flaps, and chisel and curette away all the disease than it was to make a puncture. He had had 16 cases, and in the four last he had done a radical operation, and had established no drainage of consequence through the nostril. In two of the cases he had injected paraffin, and there had been almost no deformity.

Dr. Conrad Berens, of Philadelphia, said that in his paper the incisions described were exceedingly large, the little finger being passed in from side to side. There was no better filling up of the tissue after the so-called radical operation than after doing the ordinary operation in a radical way, i. e., laying the parts open so that a good view could be obtained, and all diseased tissue removed. He claimed that the resulting deformity was less, and that the wounds healed more satisfactorily. In one of his cases practically all of the bony tissues were destroyed by an abrupt necrotic process. Such a case could not be said to be due to the infiltration of pus down into the antrum of Highmore and then into the orbit. Every case was known by the aspect which it presented at the time. All cases could not be treated alike, and each one should be treated on its individual merits and not according to any one plan.

Referring to Dr. Hoople's paper, he said that he had seen a great many of the cases described there; the whole trouble lay with a faulty diagnosis at the beginning.

Dr. G. L. Richards said that he had presented to the society a paper in which he had advocated a free incision in the treatment of frontal sinusitis. Last summer he had had an opportunity of seeing some of Jansen's cases, and he was sure no one was considered to be more radical than he. The deformity in those cases was frightful, and would not be tolerated in this country by many patients.

BOOK NOTICES.

Studies of the Internal Anatomy of the Face.

By M. H. Cryer, M. D., D. D. S., Prof. Oral Surgery, Department Dentistry, University of Penna.; with 151 illustrations from dissections by the author. pp. 176. Philadelphia. S. S. White Dental Mfg. Co.

Those members of the Section on Laryngology and Otology of the American Medical Association who have witnessed Dr. Cryer's demonstrations of the anatomy of the nose and accessory sinuses and handled his specimens will most heartily welcome this book; while all workers in the field of rhinology and dentistry will find it a mine of information as regards the bony anatomy of the face. Dr. Cryer has had made photo engravings of the most valuable of his specimens. The book consists of these engravings printed on plate paper with sufficient explanatory markings to make all the plates clear. The descriptive text is brief and concise.

Dr. Cryer does not believe that there is any precise normal type as to the internal anatomy of the face; that which we commonly regard as such being a composite. In pursuing his studies hundreds of sections of the facial region have been cut and examined. From these dissections he concludes that the accepted descriptions can not be depended upon or followed literally as a guide for surgeon or dentist.

He brings out many points of particular interest to rhinologists; among them the following:

Secondary bone deposit of inflammatory origin in the cortical and cancellated tissue of the face is an important factor in producing facial neuralgia. In the individual case it may be difficult to determine the cause of the neuralgia.

Devitalized molar teeth may cause swelling at the angle of the jaw which simulate enlarged submaxillary glands.

In extracting molar teeth from the upper jaw there is danger either of carrying away a portion of the floor of the maxillary sinus or by injudicious use of the forceps of forcing the roots into the sinus, as "in the majority of the skulls of the white race so far examined, roots of the molar teeth pass up into the walls of the antrum, being covered at the point where they approach the surface

by only a thin conical portion of bone." The common idea of rhinologists that a straight septum is unusual is probably due to the fact that the great majority of cases which they examine are abnormal.

Dr. Cryer makes the statement that the inferior meatus is the principal passageway of respiration. This statement will be regarded as an error by most rhinologists, as all the experiments seem to show that the middle meatus is the main channel for the entrance and exit of air. He states that "A sound cannot be passed from the nasal chamber through the ostium maxillare into the maxillary sinus in a normal living person." This is an anatomical point which has been somewhat discussed. Some rhinologists seem to be able to reach and treat the antrum through the natural opening, while others, of which the reviewer is one, find great difficulty in so doing. Recently Fisk has proposed to treat hay fever by insufflating aristol through the natural opening. If this statement of Cryer's is correct the procedure is impossible in the normal individual and doubly so when in the swollen condition incident to hay fever. He has never found a complete bony septum in the maxillary sinus; partial septa are common, either bony or membranous. The opening into the maxillary sinus, he thinks is arranged at the top so as to prevent undue loss of fluid while the subject is lying on the back or standing and does not regard it as arranged for drainage. The other openings into the air cells or sinuses are arranged so as to make almost complete drainage.

While recognizing that diseases of the antrum do arise from the teeth he believes that aside from constitutional diseases and malformations it is more often through the common communication between the nasal chamber, the frontal sinuses, the ethmoidal cells, and the maxillary sinus that infection is conveyed to the antrum from diseased cells and sinuses above it. It is the his observation that there are more cases in which teeth are lost through diseases of the antrum than cases in which the teeth are primarily diseased, causing infection of the antrum and associated cells. "Careless operation by the dentist sometimes causes infection of the sinus, as drilling through the tooth and the floor of the sinus, or forcing the root of a tooth into the sinus, though fracture of the wall in an unskillful effort to extract, or carelessness in drilling artificial crowns or bridges upon the teeth or roots."

A chapter is devoted to variations in the anatomical structures of the face with deductions therefrom, and another to the effects of pathological conditions in the region of the hiatus semilunaris. The latter portion of the book is of more especial interest to dentists.

The mechanical execution of the work reflects credit on the publisher. This book is an original contribution of value to the bony anatomy of the nose and accessory sinuses, and as such is commended to the attention of every rhinologist. RICHARDS.

Atlas der Krankheiten der Nose, ihre Nebenhöhlen und des Nasenrachenraumes.

By Privat-docent Dr. P. H. Gerber, Königsberg. Published in Eight Sections, by S. Karger, Berlin; 6 marks per Section.

This is really a serviceable atlas, one made for actual use. The pictures are true to nature, both in color and in design. Practically every condition affecting the nose and accessory cavities is depicted, as shown by the following list:

Normal rhinoscopic view with narrow and with wide accessory cavities.

Normal rhinoscopic view with the head drawn to one side.

Normal rhinoscopic view after cocainization.

Hypertrophy of the uncinate process.

Hypertrophy of the uncinate process with atrophy of the mucosa.

Bulla ethmoidalis.

Varieties of septal deviations (particularly fine).

Dislocation of the edge of the cartilage of the septum.

Normal epipharynx.

Recessus medius (various types).

Atresia of the choana.

Anterior synechia.

Synechia between palate and pharynx.

Membranous atresia of the choana.

Epistaxis from varicosities of the septum.

Rhinitis sicca anterior.

Ulcer of the septum.

Septal abscess.

Perforation of the septum.

Acute rhinitis.

Blenorrheic rhinitis.

Postnasal catarrh (diffused and localized).

Cyst in the recessus medius.

Rhinitis and epipharyngitis fibrinosa.

Epithelial metaplasia of the inferior turbinate.

Papillomatous degeneration of the nasal mucosa.

Atrophic rhinitis (13 figures).

Hypertrophic rhinitis (all varieties, anterior and posterior).

Papillary hypertrophy.

Hypertrophy of the epipharyngeal tonsil (the best set of pictures thus far published).

Nasal polypi (a thorough exposition of variety, size and position in the nose).

Bleeding septum polyp.

Fibroadenoma.

Fibroangioma.

Epipharyngeal fibroma.

Osteoma of the nose.

Malignant neoplasms.

Cyst of the bulla ethmoidalis.

Lipoma.

Nasal calculus.

Tooth growing in the nasal cavity.

Diseases of the accessory cavities (a very extensive set of plates).

Lupus and tuberculosis.

Syphilis.

Deformities.

Leprosy.

Where there is so much commendable it is superfluous to dwell upon individual points of excellence. The work desreves a generous reception.

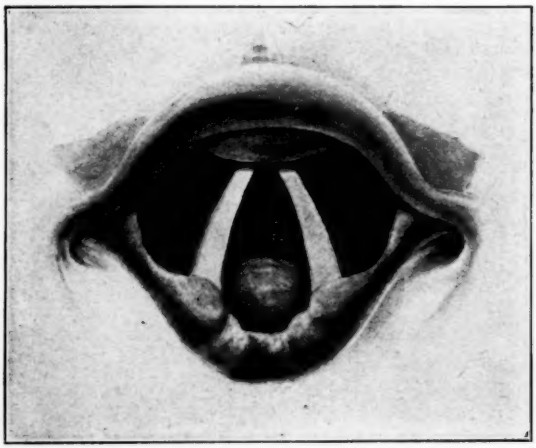

Fig. 1. Quiet inspiration.

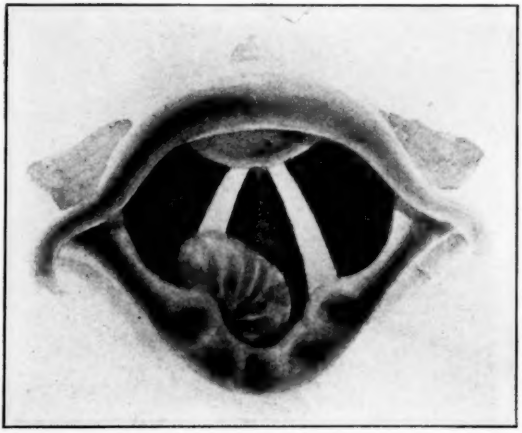

Fig. 2. First part of expiration.

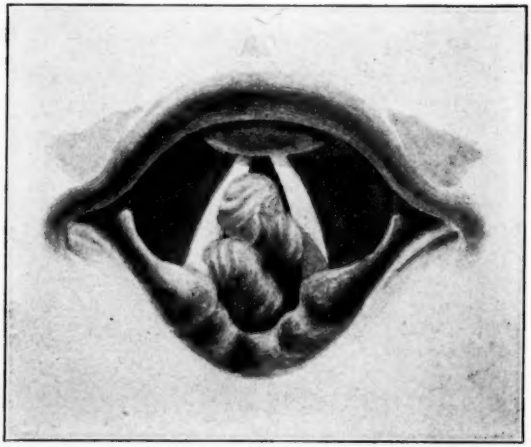

Fig. 3. Completion of expiration.

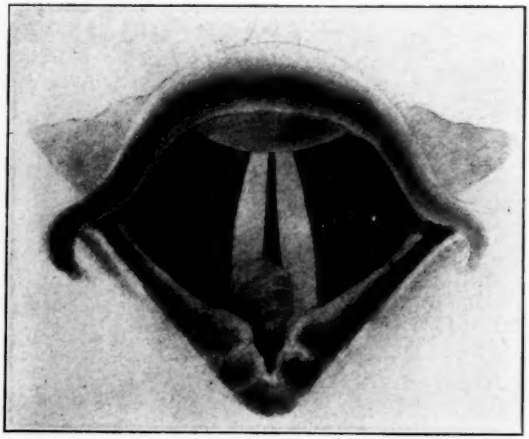

Fig. 4. Phonation.

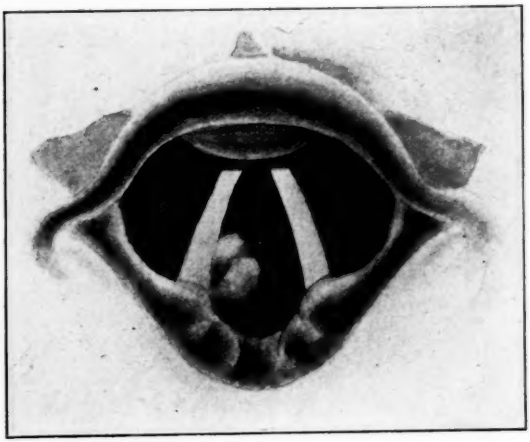

Fig. 5. Quite expiration, head turned to the left.

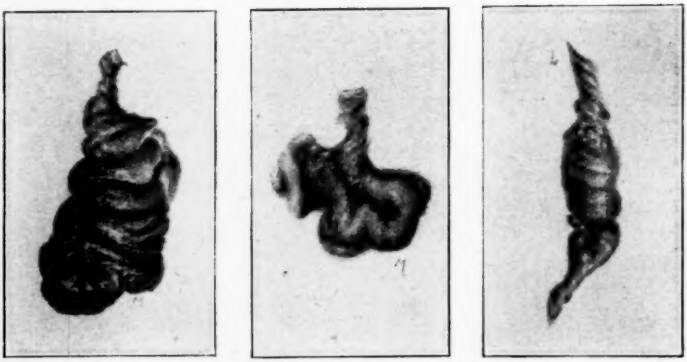

Fig. 6. The three tumors removed at the first sitting.
Double their natural size.